

## Development of Nutrient Enrichment Criteria for Iowa Streams

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## Abbreviations

### Nutrient and nutrient-response variables:

AVGMINDO – average diel minimum dissolved oxygen (mg/L)  
AVGRNGDO – average diel range of dissolved oxygen (mg/L)  
CR – community respiration ( $\text{gO}_2/\text{m}^2/\text{day}$ )  
DIN – dissolved inorganic nitrogen (mg/L)  
DIN:TN – ratio of dissolved inorganic nitrogen to total nitrogen  
DOP – dissolved orthophosphate (mg/L)  
GPP – gross primary production ( $\text{gO}_2/\text{m}^2/\text{day}$ )  
NHX – total ammonia nitrogen (mg/L)  
NOX – nitrate + nitrite nitrogen (mg/L)  
NPP – net primary production ( $\text{gO}_2/\text{m}^2/\text{day}$ )  
ORGN – organic nitrogen (mg/L)  
PRTCP – particulate-bound phosphorus (mg/L)  
TKN – total Kjelhahl nitrogen (mg/L)  
TN – total nitrogen (mg/L)  
TN:TP – ratio of total nitrogen to total phosphorus  
TP – total phosphorus (mg/L)  
PCHLA – periphyton chlorophyll A ( $\mu\text{g}/\text{cm}^2$ )  
PR – ratio of gross primary production to community respiration  
SCHLA – sediment chlorophyll A ( $\mu\text{g}/\text{cm}^2$ )  
WCHLA – water column (seston) chlorophyll A ( $\mu\text{g}/\text{L}$ )

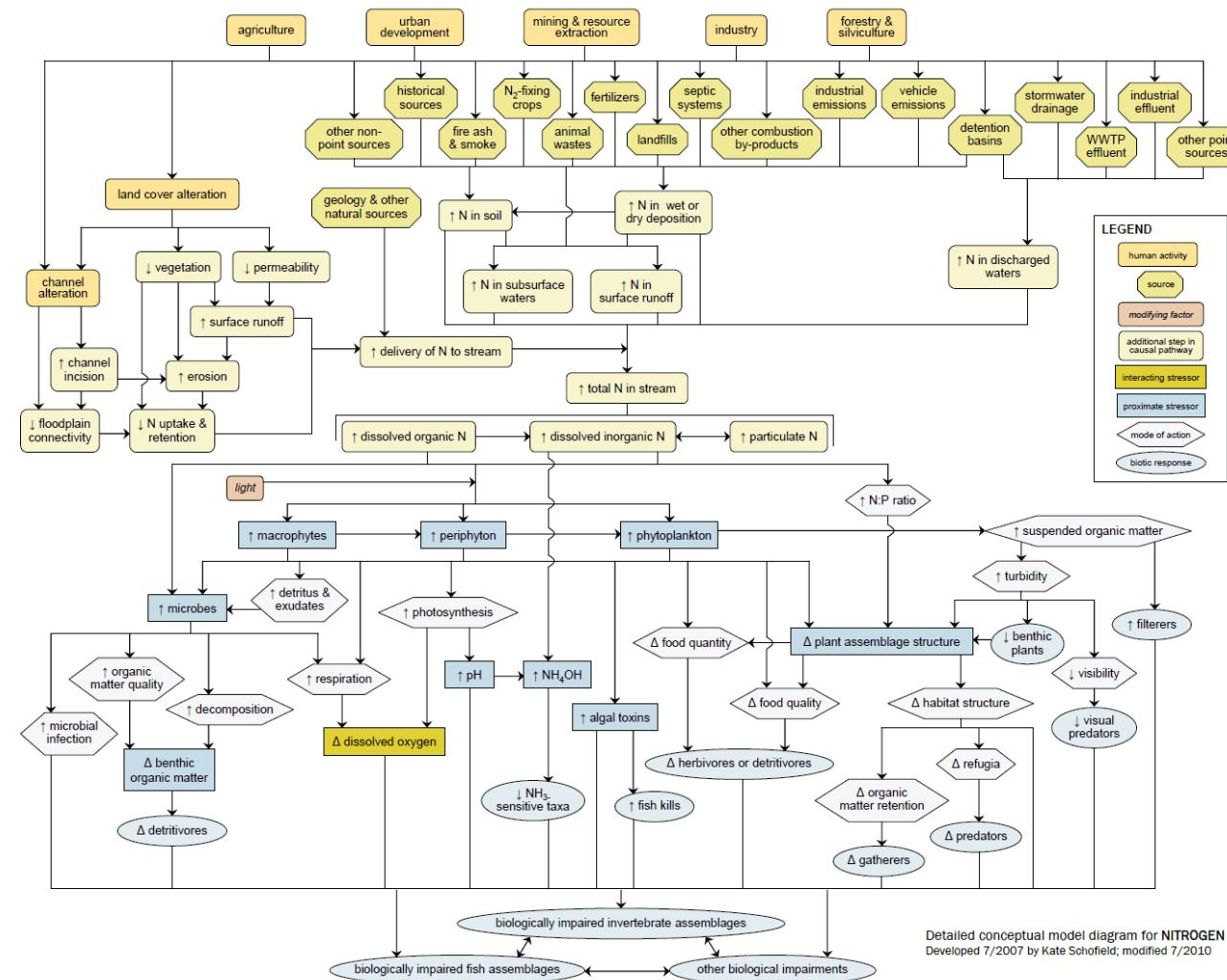
### BMIBI – Benthic Macroinvertebrate Index of Biotic Integrity

MHEPTX – multi-habitat number of EPT (Ephemeroptera, Plecoptera, Trichoptera) taxa  
MHSNSTV - multi-habitat number of sensitive taxa  
MHTTX – multi-habitat number of total taxa  
SHCHIR – standard habitat percent abundance Chironomidae taxa  
SHDFFG – standard habitat percent abundance dominant functional feeding group  
SHEPHM – standard habitat percent abundance Ephemeroptera taxa  
SHEPTX – standard habitat number of EPT (Ephemeroptera, Plecoptera, Trichoptera) taxa  
SHMHBI – standard habitat modified Hilsenhoff biotic index  
SHP3DOM – standard habitat percent abundance top three dominant taxa  
SHPEPT – standard habitat number of EPT taxa  
SHSCRPR – standard habitat percent abundance scraper organisms  
SHTTX – standard habitat number of total taxa

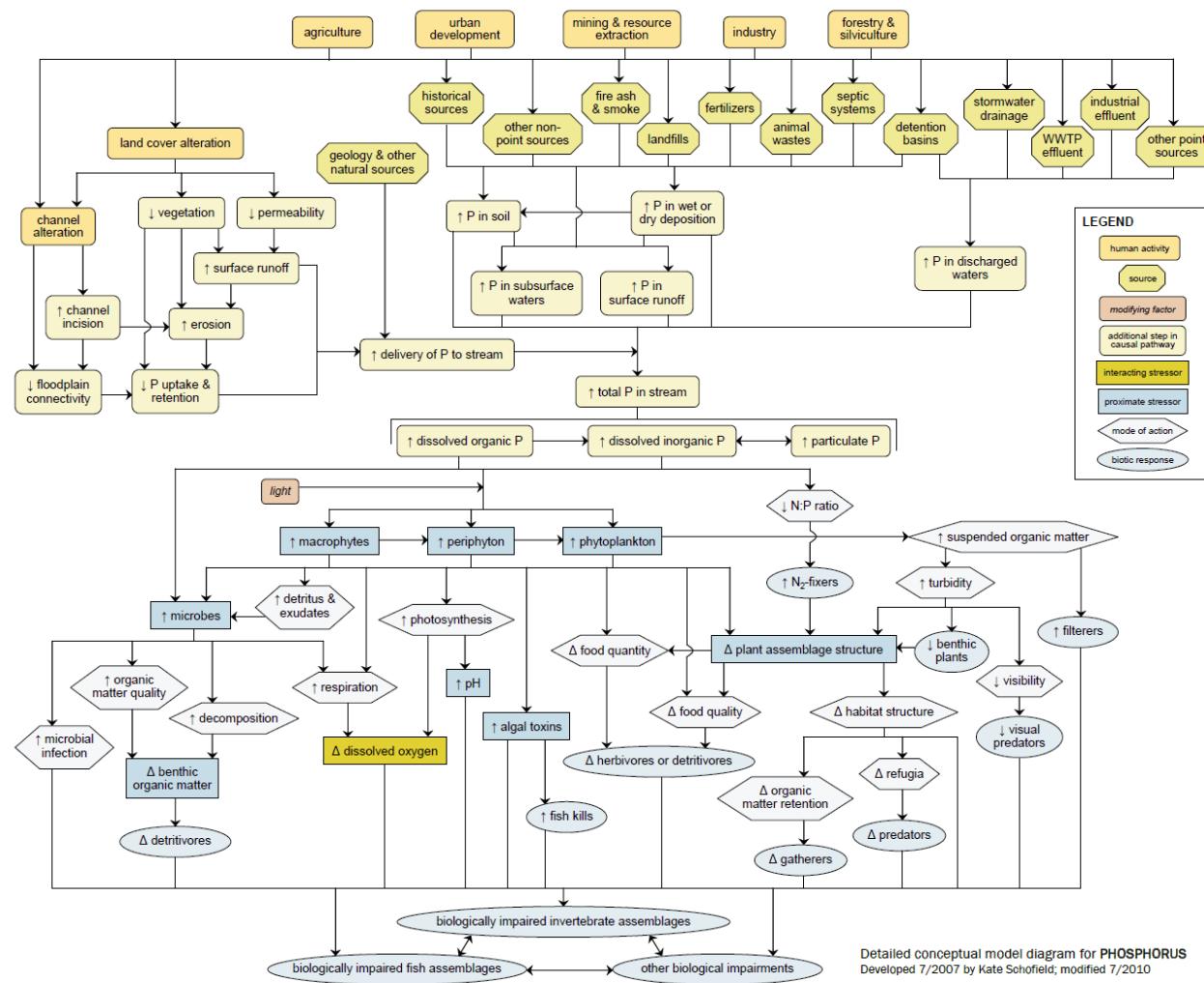
### FIBI – Fish Index of Biotic Integrity

ACPUE – fish adjusted catch per unit effort  
BINVSP – number of benthic invertivore fish species  
NTVSP – number of native fish species  
P3ABUND – percent abundance top three dominant fish species  
PBINV – percent abundance benthic invertivore fish species  
PDELT – percent abundance fish with deformities (D), eroded fins (E), Lesions (L), Tumors (T)  
POMNV – percent abundance omnivore fish species  
PSLITH – percent abundance simple lithophil fish species  
PTOPC – percent abundance top carnivore fish species  
SCKRSP – number of sucker fish species  
SNSTVSP – number of sensitive fish species  
TOLindx – fish species tolerance index

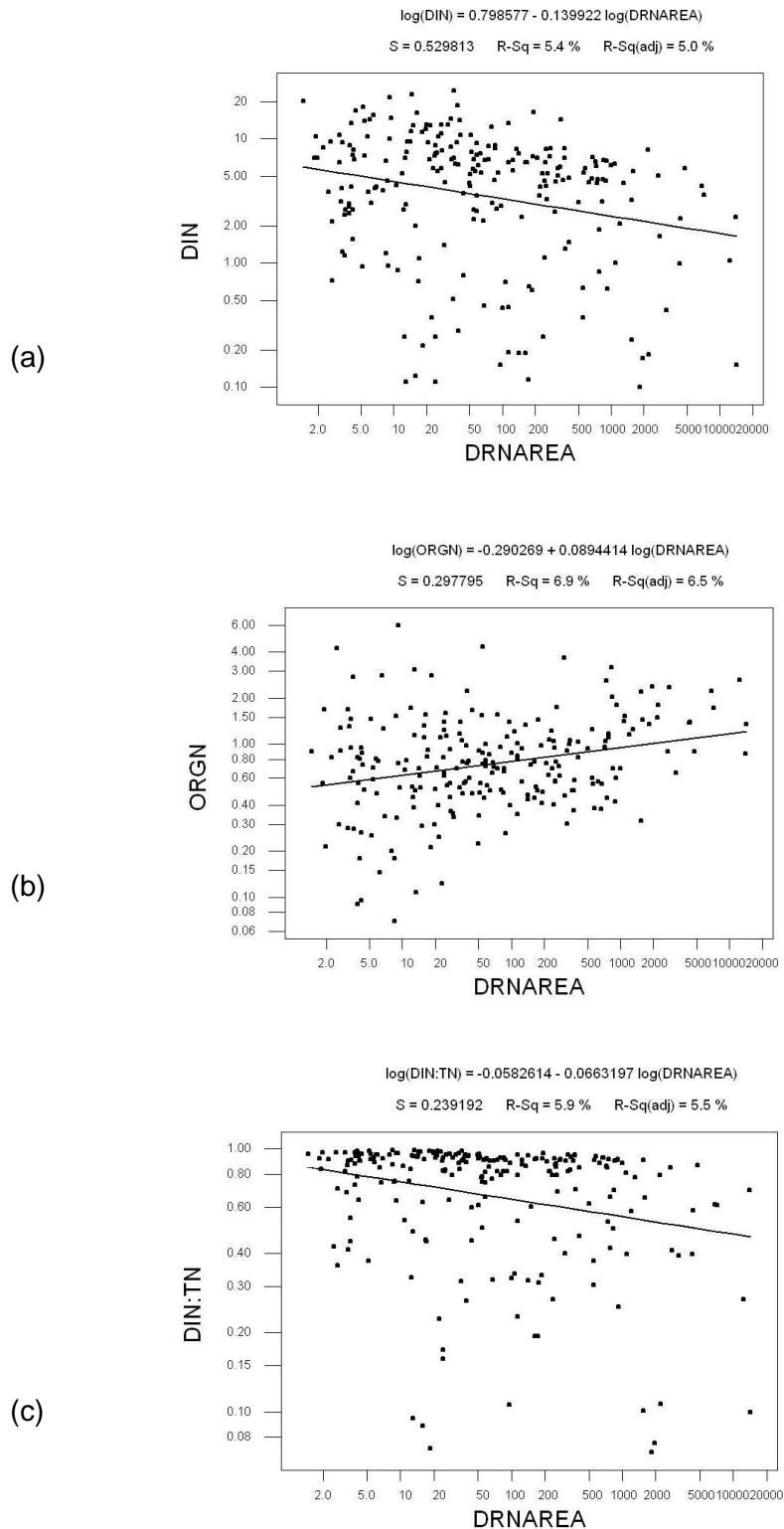




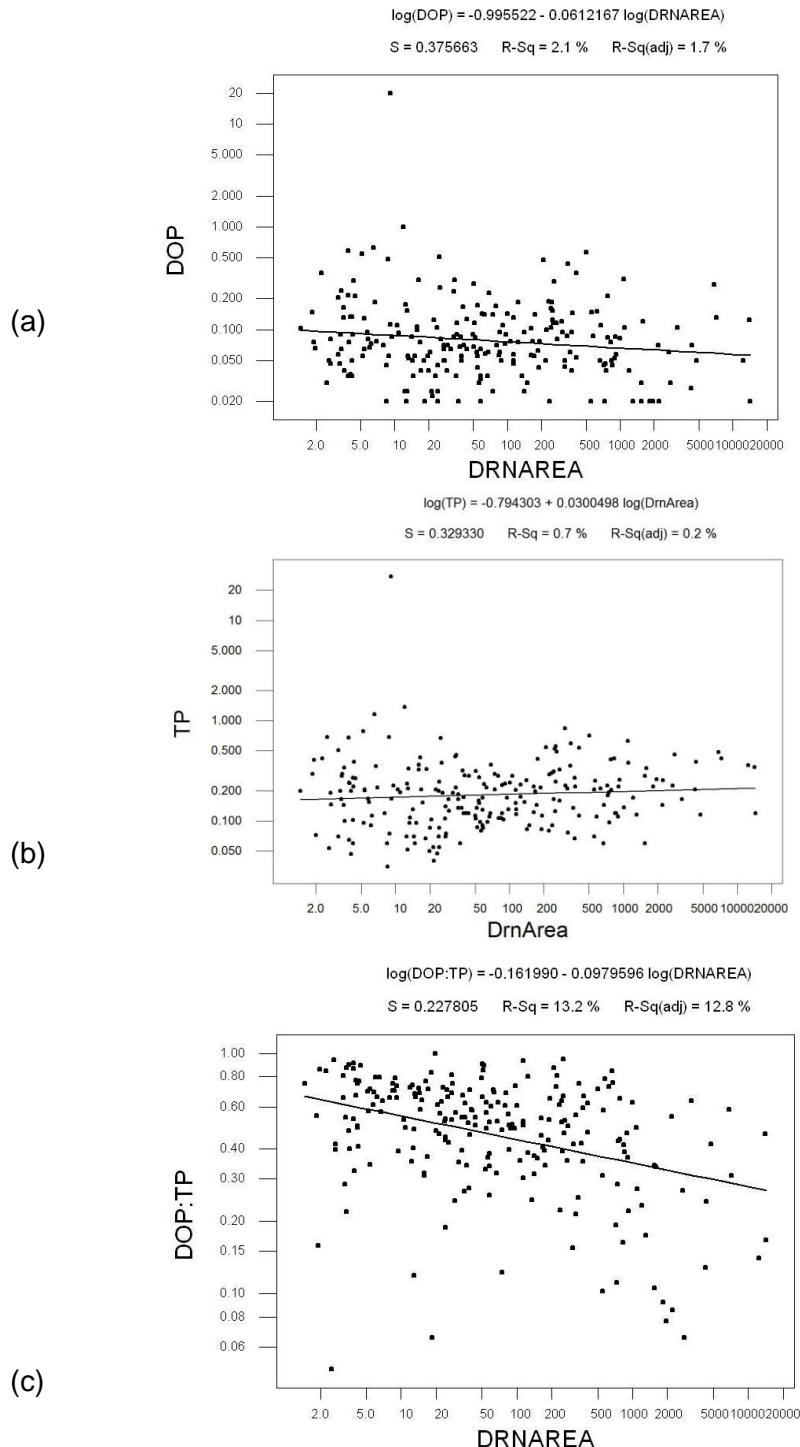
Appendix 1(a). Nitrogen stressor-response conceptual model diagram (U.S. EPA CADDIS, 2010).



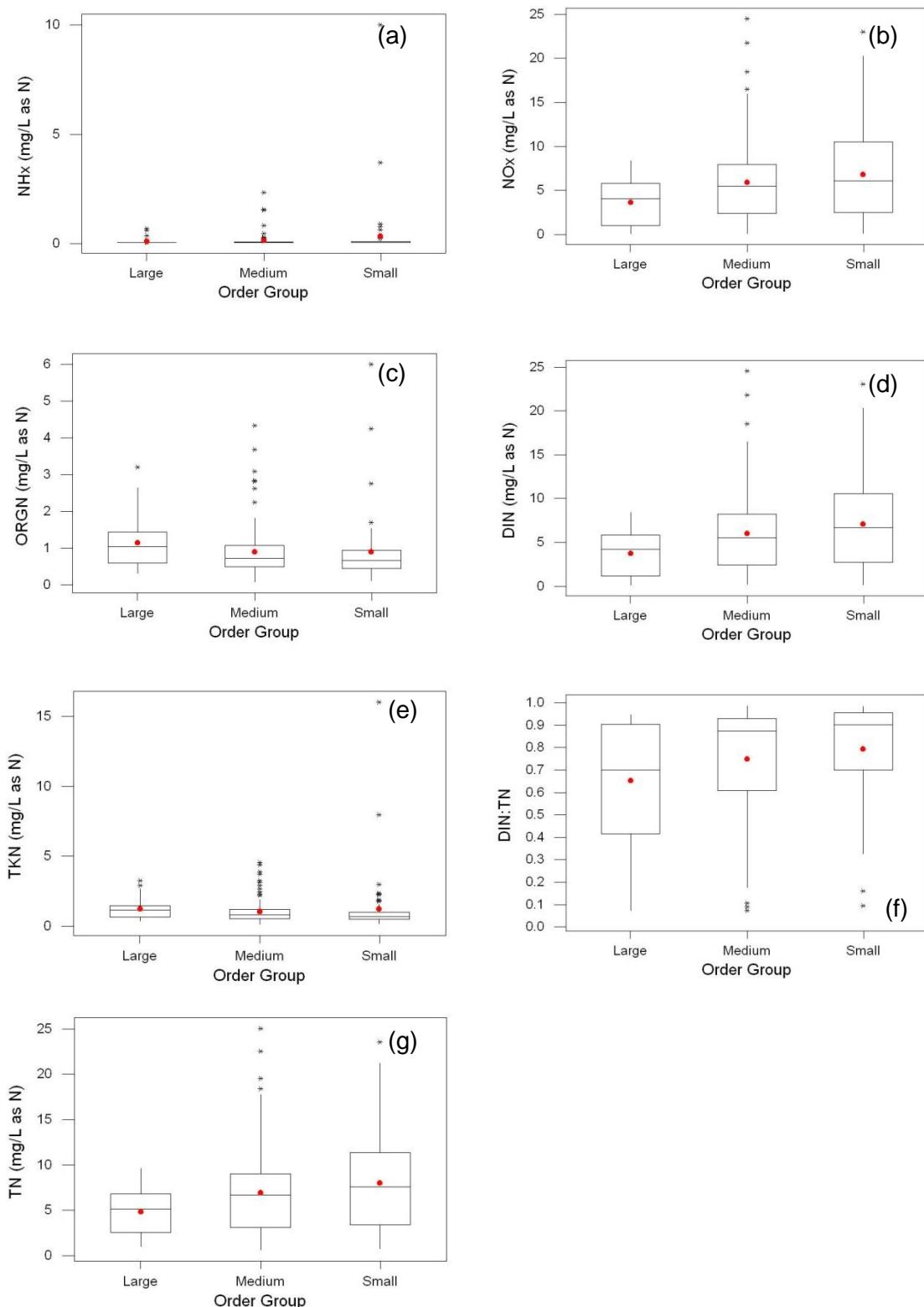
Appendix 1(b). Phosphorus stressor-response conceptual model diagram (U.S. EPA CADDIS, 2010).



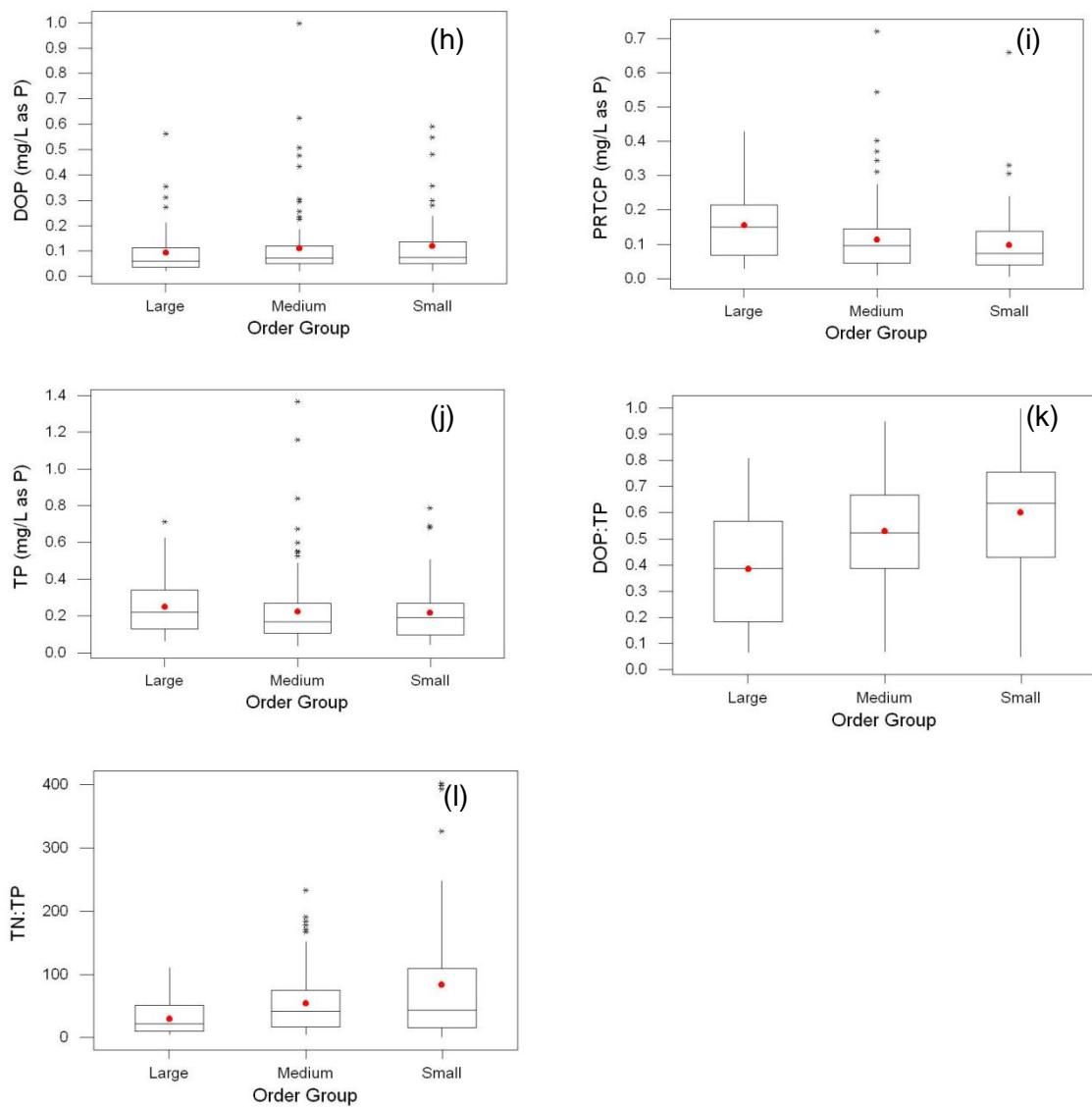
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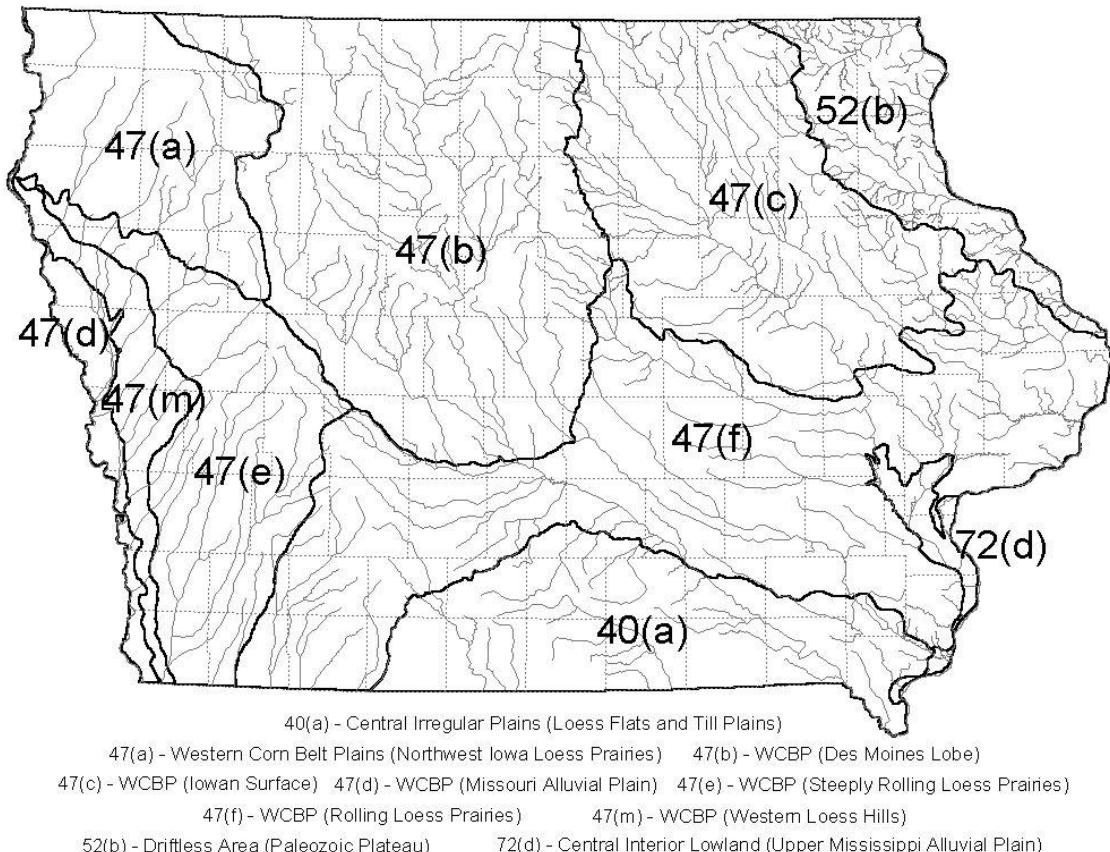
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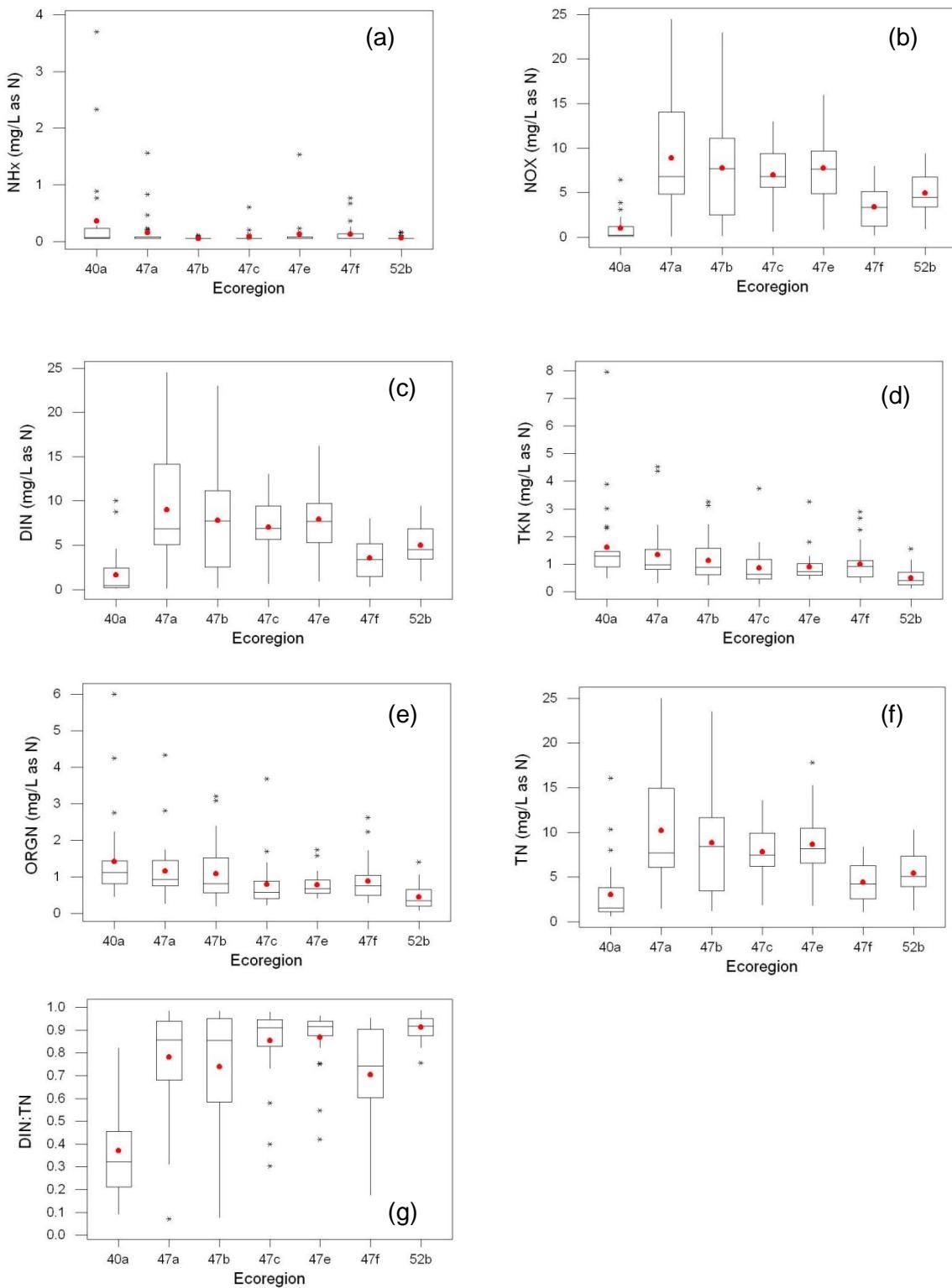
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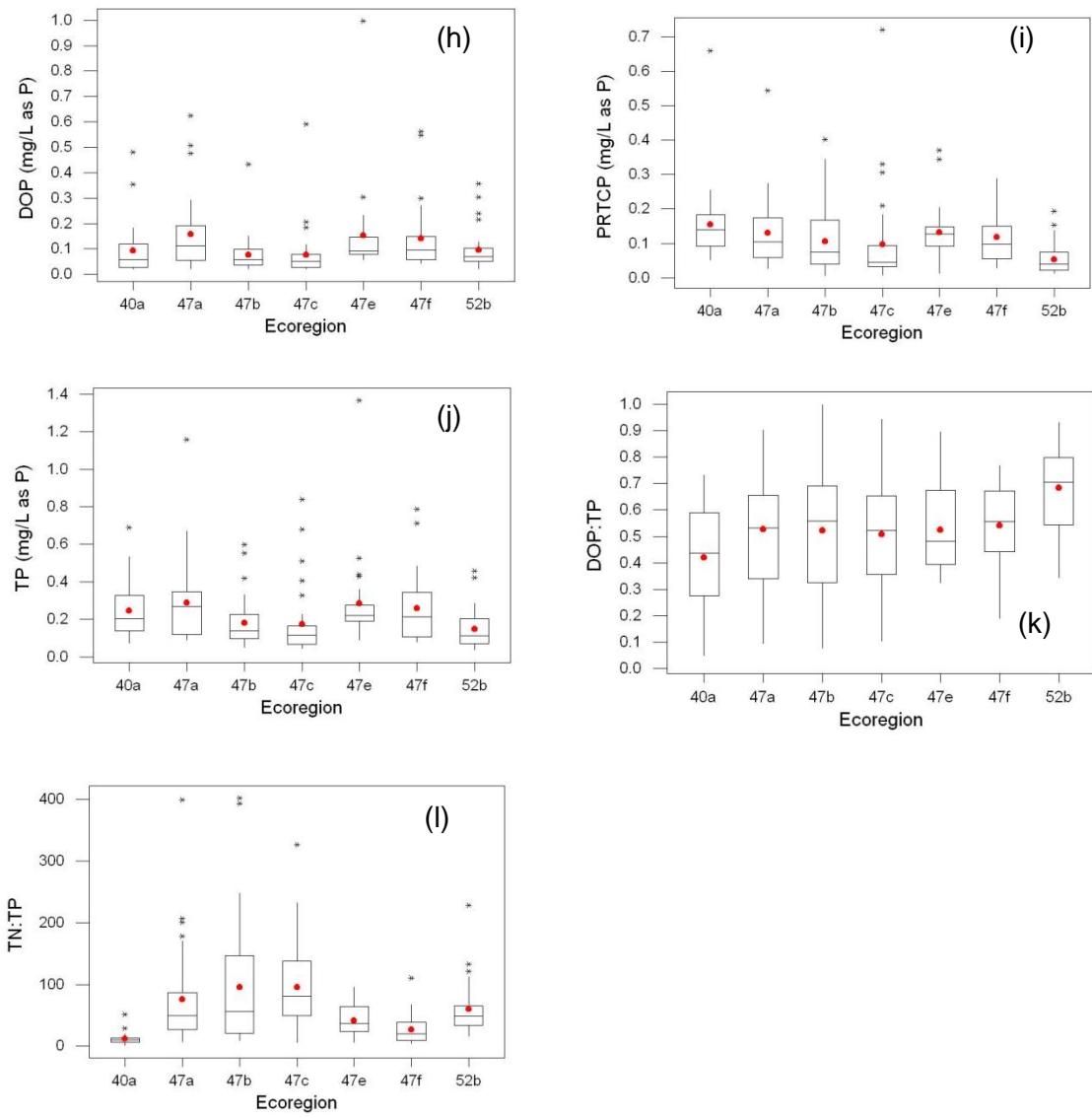
Appendix 4(h)-(l). Nutrient variables (see Abbreviations) by Strahler stream order group: Small (2); Medium (3-4); Large (5-7). REMAP project sampling results 2002-2006. (red dot indicates mean value)



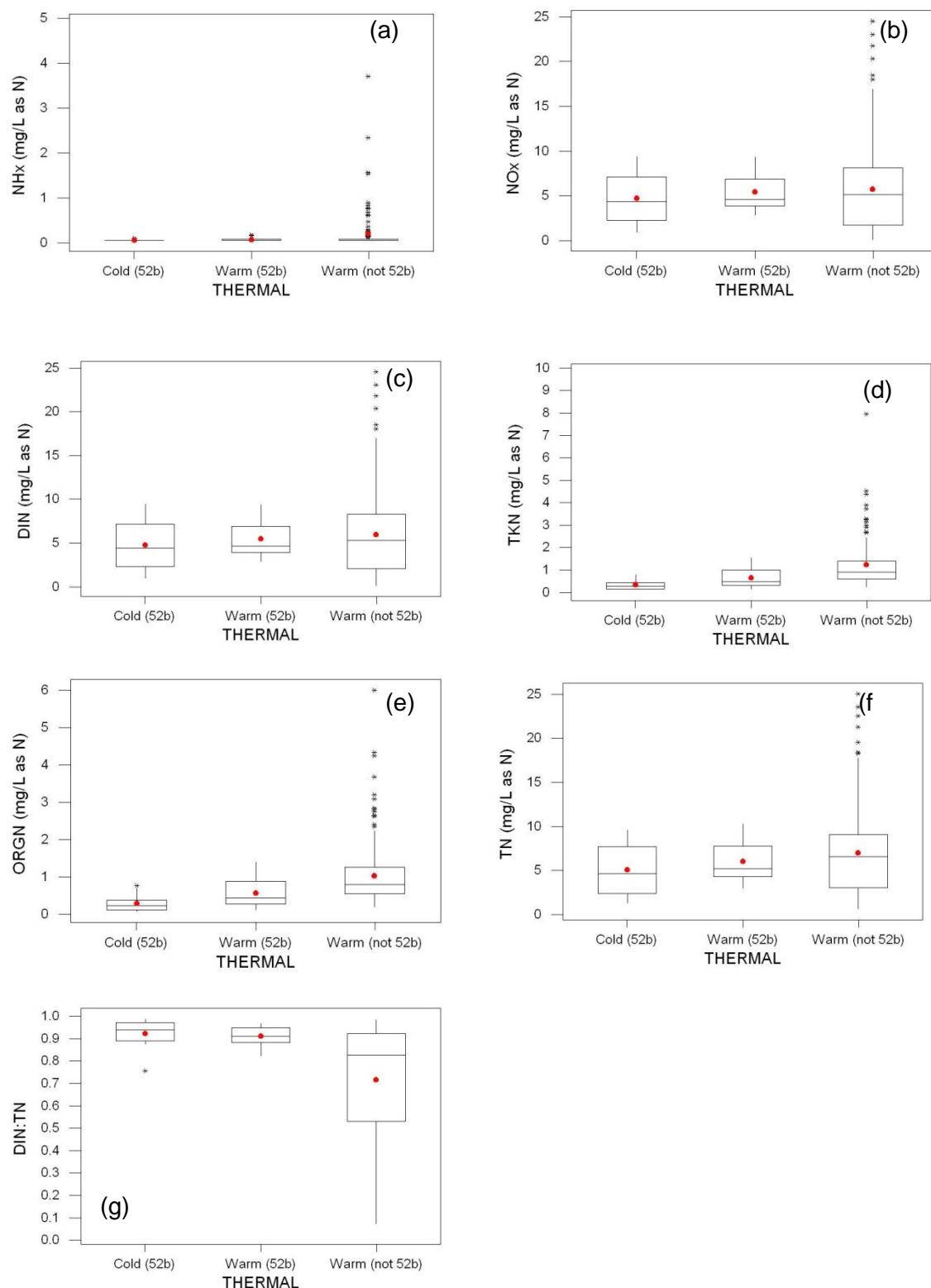
Appendix 5. Ecoregions of Iowa (after Chapman et al. 2002). (Level III Ecoregions are indicated by numeric designators - Level IV Ecoregions are indicated in parentheses)



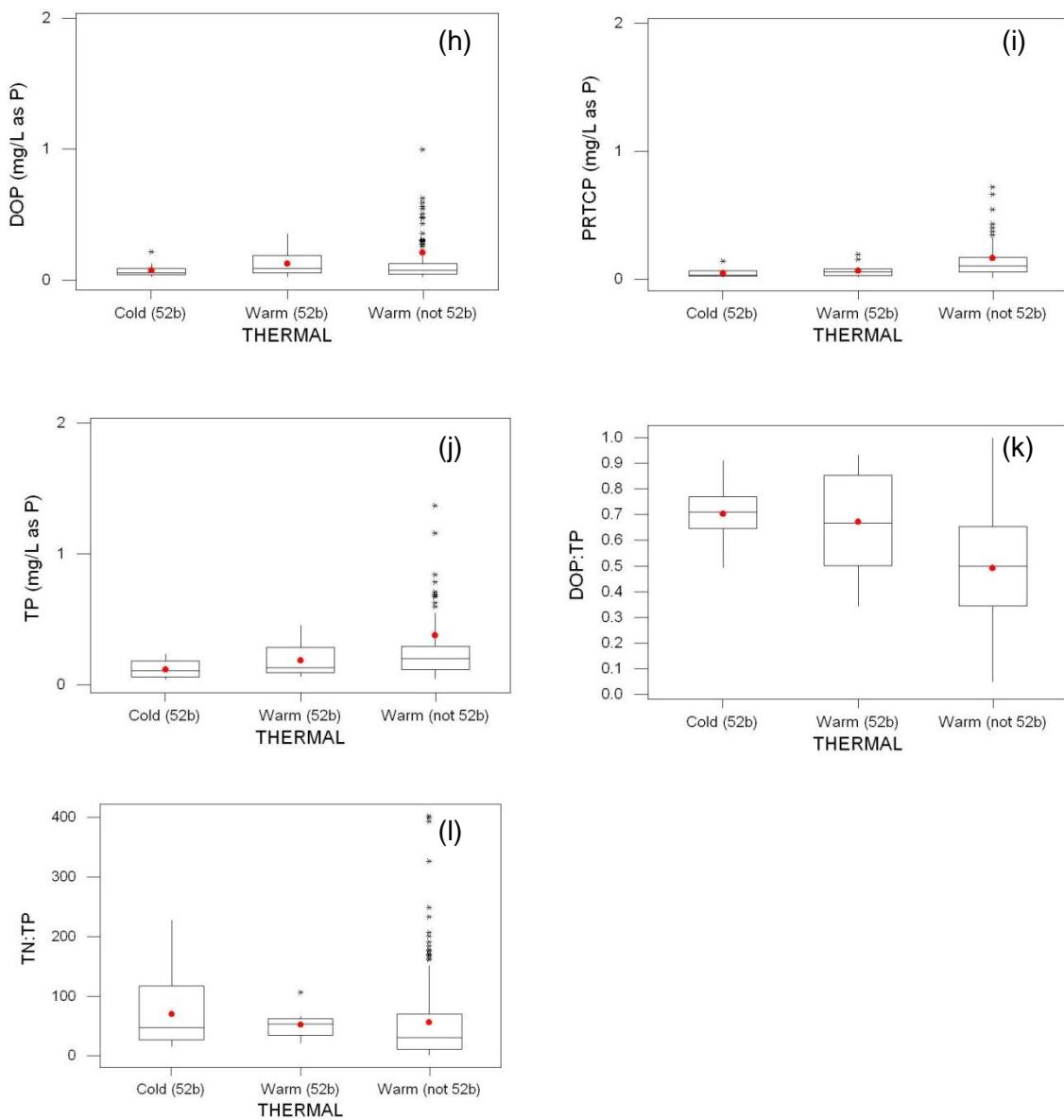
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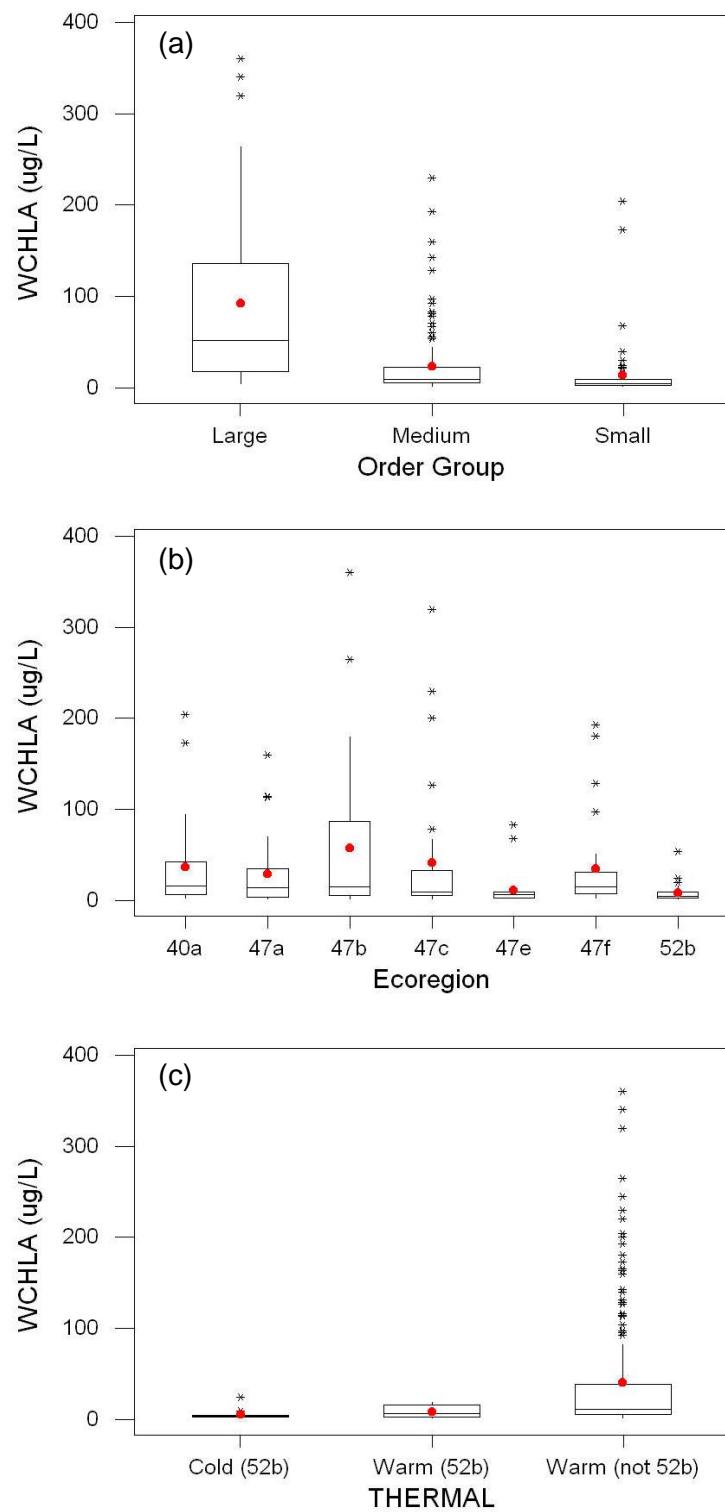
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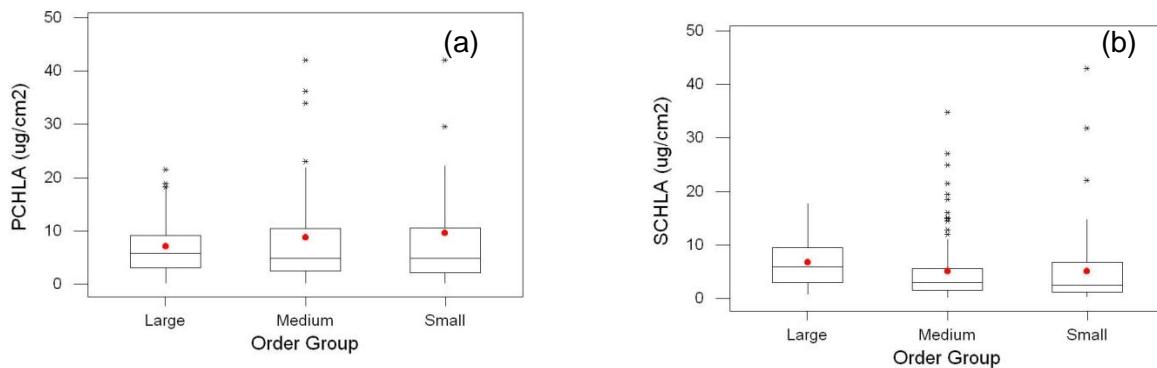
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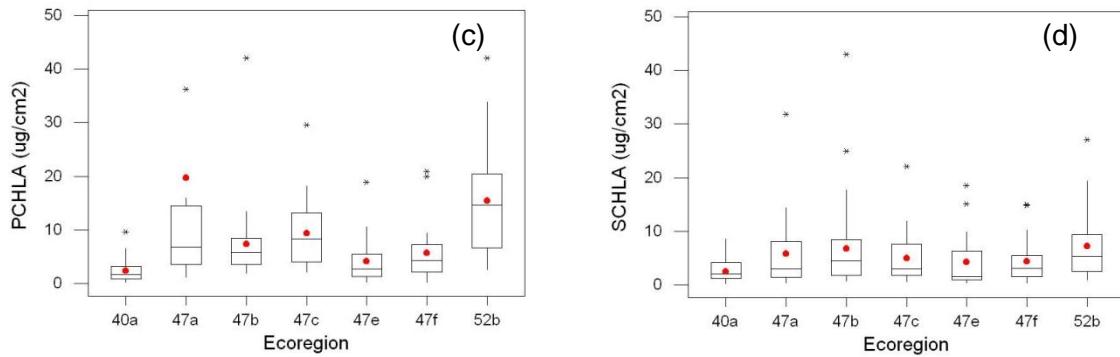
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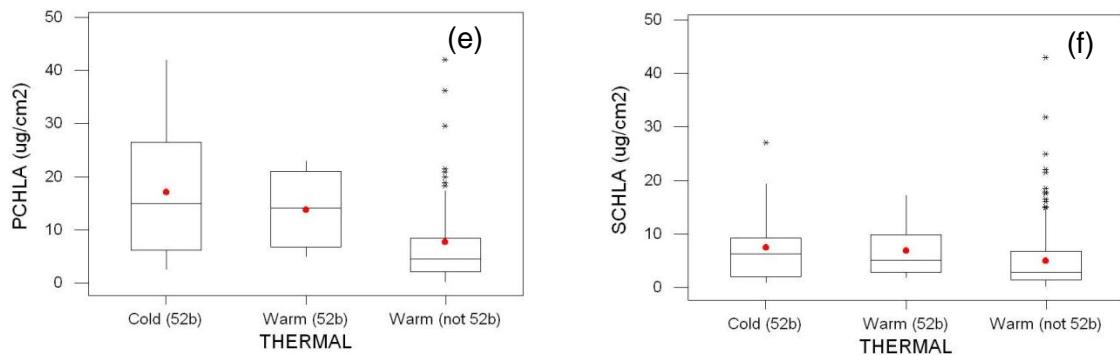
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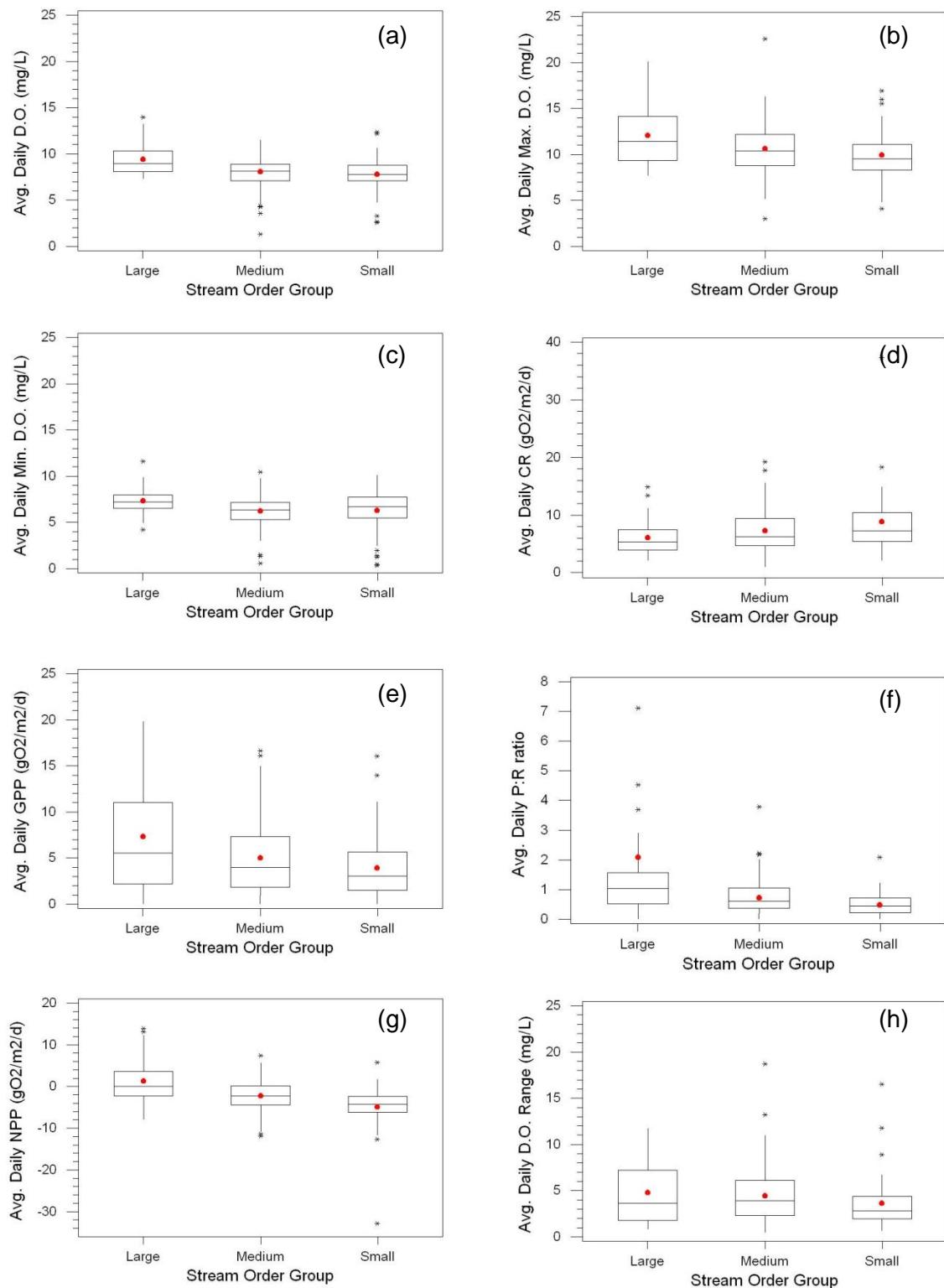
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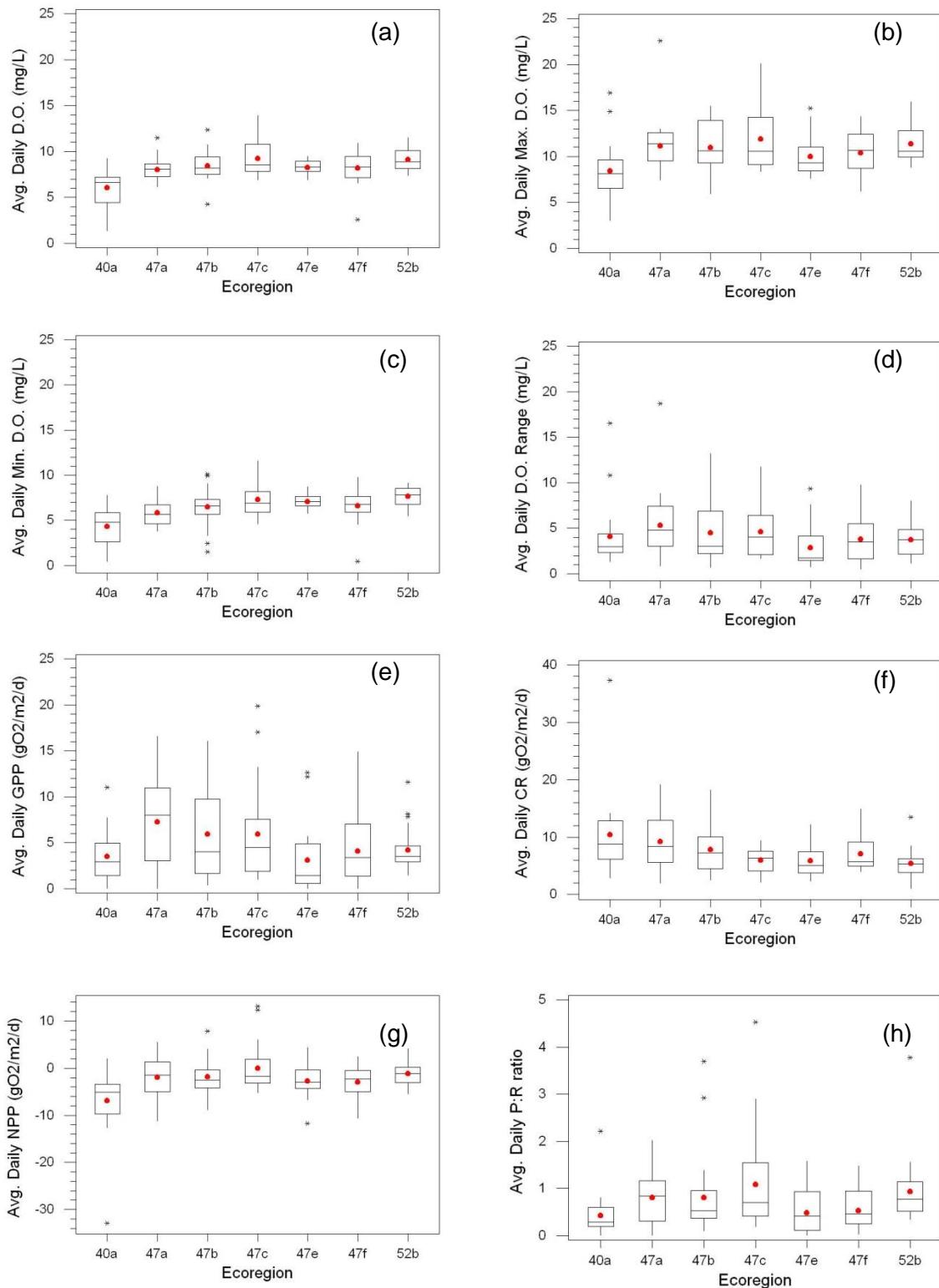
Appendix 9(c) Periphyton chlorophyll A (PCHLA) and (d) sediment chlorophyll A (SCHLA) by ecoregion. (two outlier values  $>100 \mu\text{g}/\text{cm}^2$  were excluded from PCHLA plot for illustrative purposes) (red dot indicates mean value)



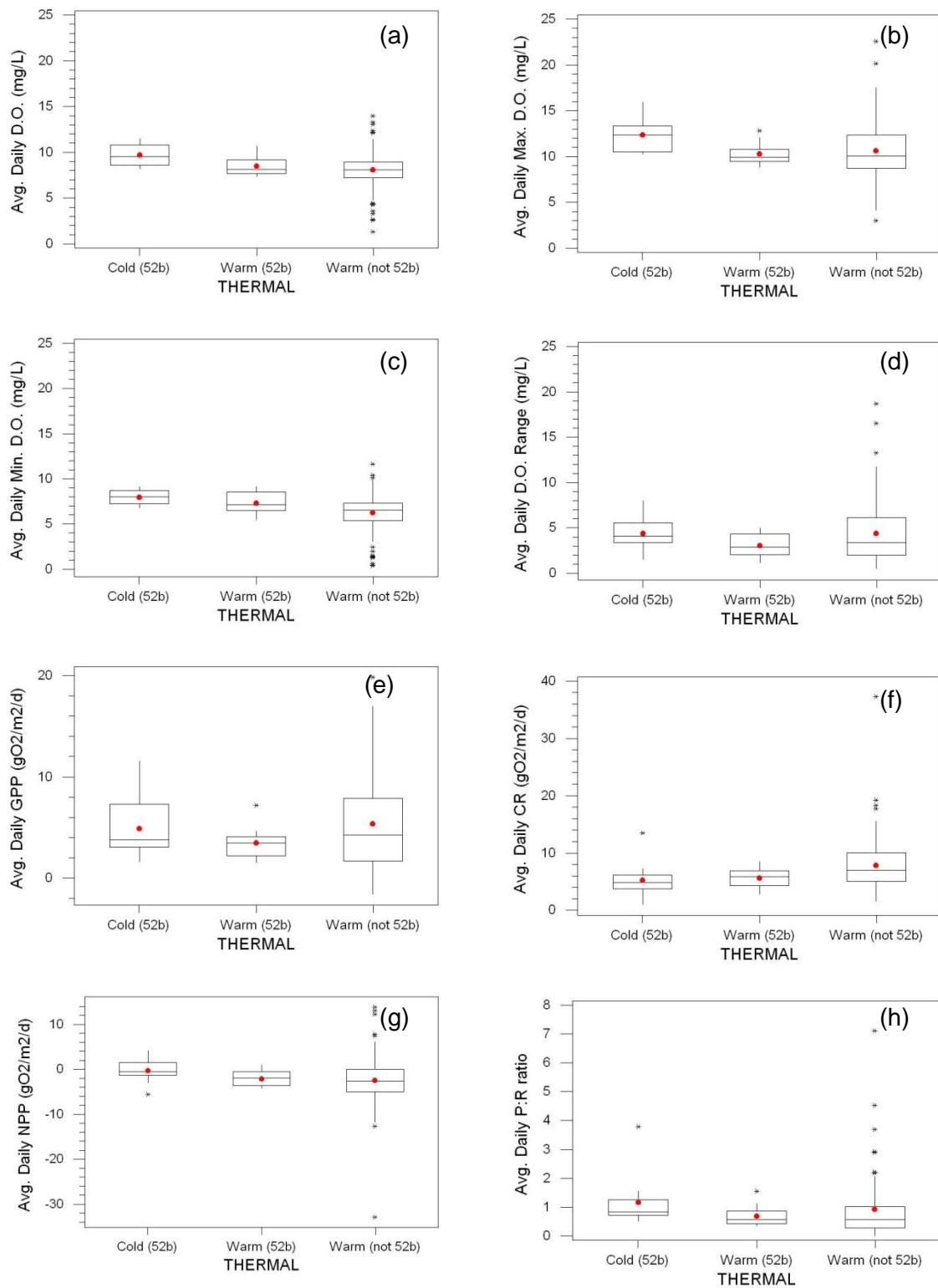
Appendix 9(e) Periphyton chlorophyll A (PCHLA) and (f) sediment chlorophyll A (SCHLA) by thermal/ecoregion group. (two outlier values  $>100 \mu\text{g}/\text{cm}^2$  were excluded from PCHLA plot for illustrative purposes) (red dot indicates mean value)



Appendix 10(a)-(h). Diel dissolved oxygen and stream metabolism variables (see *Abbreviations*) by Strahler stream order group: Small (2); Medium (3-4); Large (5-7)..



Appendix 11(a)-(h). Diel dissolved oxygen and stream metabolism variables (see *Abbreviations*) by ecoregion (see Appendix 5).



Appendix 12(a)-(h). Diel dissolved oxygen and stream metabolism variables (see Abbreviations) by thermal (ecoregion) group.

Appendix 13(a). Statistical summary of BMIBI and component metric scores (see *Abbreviations*) sampled from wadeable, warmwater random sites (RNDM) and reference (REF) sites.

	Site Type	N	Mean	Std.Dev.	Minimum	Q25	Median	Q75	Maximum
BMIBI	REF	88	61.2	12.2	24.0	53.2	63.0	70.0	81.5
	RNDM	123	52.6	15.7	13.0	43.0	56.0	64.0	80.0
mhb1	REF	88	5.2	0.5	3.7	4.9	5.2	5.5	6.8
	RNDM	123	5.5	0.7	3.9	5.0	5.5	5.8	7.2
mhbiscr	REF	88	6.6	1.7	1.3	5.7	6.8	7.7	10.0
	RNDM	123	5.7	2.3	0.0	4.4	5.7	7.6	10.0
mheptx	REF	88	15.0	4.9	5.0	11.1	15.0	18.0	27.0
	RNDM	123	12.4	6.4	1.0	7.0	12.0	16.0	27.0
mheptxscr	REF	88	6.4	1.9	2.3	4.9	6.5	7.6	10.0
	RNDM	123	5.2	2.4	0.4	3.3	5.2	6.9	10.0
mhsnstv	REF	88	5.3	2.8	0.0	3.0	5.0	7.0	13.5
	RNDM	123	3.5	3.2	0.0	1.0	3.0	5.0	12.0
mhsnstvscr	REF	88	5.1	2.5	0.0	3.1	4.9	6.9	10.0
	RNDM	123	3.4	2.9	0.0	0.9	2.7	5.5	10.0
mhttx	REF	88	33.0	7.5	16.0	29.0	32.9	36.5	54.0
	RNDM	123	30.4	9.0	14.0	23.0	29.0	38.0	59.0
mhttxscr	REF	88	6.9	1.5	3.8	5.9	6.6	7.9	10.0
	RNDM	123	6.3	1.8	2.7	4.9	6.1	7.5	10.0
shchir	REF	88	18.5	14.9	1.0	6.3	15.6	24.4	68.1
	RNDM	123	28.6	21.8	0.0	11.5	23.4	39.3	91.6
shchirscr	REF	88	8.2	1.5	3.2	7.6	8.5	9.5	10.0
	RNDM	123	7.2	2.2	0.8	6.1	7.7	8.9	10.0
shdffg	REF	88	60.5	9.9	42.4	54.2	59.2	67.0	94.4
	RNDM	123	63.4	13.8	41.5	53.2	59.3	72.0	98.4
shdffgscr	REF	88	6.6	1.6	0.9	5.5	6.8	7.6	9.6
	RNDM	123	6.1	2.3	0.3	4.7	6.8	7.8	9.7
sheph	REF	88	32.8	17.9	2.1	20.9	31.8	43.2	92.0
	RNDM	123	28.1	20.8	0.0	10.6	22.8	44.2	81.0
shephscr	REF	88	4.2	2.2	0.3	2.7	4.1	5.5	10.0
	RNDM	123	3.6	2.7	0.0	1.4	2.9	5.7	10.0
sheptx	REF	88	8.8	2.4	1.8	7.0	9.0	10.5	13.2
	RNDM	123	7.8	3.3	0.0	5.2	8.0	10.0	16.7
sheptxscr	REF	88	6.7	1.7	1.6	5.6	6.8	7.9	10.0
	RNDM	123	5.8	2.3	0.0	4.5	6.0	7.5	10.0
shp3dom	REF	88	66.1	10.7	46.9	58.6	65.4	73.6	93.4
	RNDM	123	70.4	13.0	46.3	59.7	69.7	80.0	99.0
shp3domscr	REF	88	6.0	1.8	1.1	4.5	6.3	7.3	10.0
	RNDM	123	5.2	2.3	0.2	3.6	5.5	6.9	10.0
shpept	REF	88	65.9	17.2	11.2	54.6	67.9	78.7	96.3
	RNDM	123	55.4	25.6	0.0	38.1	60.5	77.1	94.7
shpeptscr	REF	88	6.9	1.8	1.2	5.7	7.1	8.2	10.0
	RNDM	123	5.8	2.7	0.0	4.0	6.3	8.1	9.9
shscrpr	REF	88	14.5	11.1	0.2	6.3	14.0	19.1	63.7
	RNDM	123	11.7	11.2	0.0	4.3	8.4	15.8	59.6
shscrprscr	REF	88	3.2	2.2	0.1	1.4	3.1	4.2	10.0
	RNDM	123	2.6	2.3	0.0	1.0	1.9	3.5	10.0
shttx	REF	88	13.2	2.9	5.8	11.2	13.1	15.1	19.8
	RNDM	123	12.4	3.4	4.0	10.3	12.7	14.3	22.7
shttxscr	REF	88	6.7	1.6	2.8	5.5	6.5	7.9	10.0
	RNDM	123	6.3	1.8	2.2	5.1	6.2	7.5	10.0

Appendix 13(b). Statistical summary of FIBI and component metric scores (see *Abbreviations*) sampled at wadeable, warmwater random (RNDM) sites and reference (REF) sites.

	Site Type	N	Mean	Std.Dev.	Minimum	Q25	Median	Q75	Maximum
FIBI	REF	88	51.4	15.0	23.5	39.4	49.8	62.2	82.5
	RNDM	131	34.1	18.0	0.0	21.0	33.0	45.0	90.0
acpue	REF	88	54.4	42.9	6.0	25.0	44.0	64.6	219.5
	RNDM	131	35.0	38.0	0.0	7.8	22.9	50.5	215.9
acpuescr	REF	88	4.7	2.6	0.6	2.5	4.3	6.1	10.0
	RNDM	131	3.2	2.9	0.0	0.8	2.3	5.1	10.0
binvsp	REF	88	5.6	2.8	1.0	3.0	5.4	8.0	12.0
	RNDM	131	3.4	2.7	0.0	1.0	3.0	5.0	12.0
binvpscr	REF	88	6.0	2.0	1.7	4.4	6.2	7.3	10.0
	RNDM	131	3.7	2.5	0.0	1.7	3.7	5.0	10.0
ntvsp	REF	88	18.6	5.5	8.5	14.4	17.6	22.4	32.0
	RNDM	131	13.9	6.4	0.0	10.0	13.0	18.0	33.0
ntvpscr	REF	88	7.0	1.5	4.3	6.0	7.0	8.2	10.0
	RNDM	131	5.4	2.1	0.0	3.9	5.4	6.6	10.0
p3abund	REF	88	59.3	10.2	36.3	51.5	59.4	66.1	82.4
	RNDM	131	69.2	14.9	35.1	59.4	67.3	79.9	100.0
p3abundscr	REF	88	6.7	1.6	2.1	5.7	6.8	8.1	10.0
	RNDM	131	4.9	2.6	0.0	2.8	5.3	6.8	10.0
pbinv	REF	88	17.9	12.4	1.8	8.5	14.4	25.8	54.5
	RNDM	131	9.2	10.8	0.0	1.8	5.4	13.7	62.1
pbinvscr	REF	88	4.0	2.4	0.3	2.0	3.7	5.6	10.0
	RNDM	131	2.1	2.4	0.0	0.4	1.2	2.8	10.0
pdelt	REF	88	0.3	0.5	0.0	0.1	0.2	0.4	3.5
	RNDM	131	0.6	1.9	0.0	0.0	0.1	0.4	19.3
pdeltadj	REF	88	-0.2	0.9	-7.5	0.0	0.0	0.0	0.0
	RNDM	131	-0.3	1.5	-10.0	0.0	0.0	0.0	0.0
pomnv	REF	88	24.9	14.6	5.8	13.3	22.5	32.0	80.2
	RNDM	131	27.3	17.3	0.0	16.0	23.9	36.9	76.2
pomnvs脆	REF	88	7.3	2.0	0.7	6.3	7.5	8.9	10.0
	RNDM	131	6.3	2.9	0.0	4.9	7.0	8.4	10.0
pslitho	REF	88	6.9	7.6	0.0	1.0	4.7	9.1	30.1
	RNDM	131	2.7	5.4	0.0	0.0	0.7	2.9	31.2
pslithoscr	REF	88	2.7	2.5	0.0	0.5	2.3	4.4	9.1
	RNDM	131	1.1	1.9	0.0	0.0	0.3	1.3	10.0
ptcv	REF	88	2.7	3.2	0.0	0.4	1.6	3.9	15.3
	RNDM	131	2.3	5.4	0.0	0.0	0.0	2.5	33.9
ptcvscr	REF	88	3.3	2.3	0.0	1.4	3.1	4.8	10.0
	RNDM	131	1.7	2.2	0.0	0.0	0.0	3.4	8.4
sckrsp	REF	88	3.2	1.9	0.0	1.5	3.0	4.5	8.0
	RNDM	131	1.9	1.8	0.0	1.0	1.0	3.0	8.0
sckrspscr	REF	88	5.6	2.4	0.0	3.9	5.6	7.6	10.0
	RNDM	131	3.5	2.8	0.0	1.5	3.0	5.2	10.0
snstvsp	REF	88	3.5	3.3	0.0	1.0	2.5	5.4	11.5
	RNDM	131	1.8	2.6	0.0	0.0	1.0	2.5	14.0
snstvpscr	REF	88	3.8	3.1	0.0	1.5	3.4	6.0	10.0
	RNDM	131	2.0	2.6	0.0	0.0	1.0	3.3	10.0
tolindx	REF	88	6.4	1.5	3.1	5.3	6.7	7.6	9.1
	RNDM	131	7.2	1.5	2.9	6.3	7.2	8.3	10.0
tolindxscr	REF	88	5.6	2.3	1.5	3.8	5.3	7.4	10.0
	RNDM	131	4.1	2.4	0.0	2.4	4.1	5.7	10.0

**Appendix 14. Summary of phytoplankton taxa observed in 45 stream and 392 lake samples collected during Summer 2011.**

Taxa Division	Genus/Taxa	Stream Samples			Lake Samples		
		Frequency (%)	Median Wetmass (mg/L)	Maximum Wetmass (mg/L)	Frequency (%)	Median Wetmass (mg/L)	Maximum Wetmass (mg/L)
BACILLARIOPHYCEAE	Acanthoceras	2.2	0.01	0.01	0.3	0.02	0.02
BACILLARIOPHYCEAE	Amphora	8.9	0.05	0.12	4.3	0.03	0.55
BACILLARIOPHYCEAE	Asterionella	2.2	0.02	0.02	10.2	0.54	20.12
BACILLARIOPHYCEAE	Aulacoseira	0.0	0.00	0.00	39.5	0.32	134.84
BACILLARIOPHYCEAE	Caloneis	0.0	0.00	0.00	2.6	0.02	1.23
BACILLARIOPHYCEAE	Coccneis	15.6	0.01	0.06	2.6	0.03	0.57
BACILLARIOPHYCEAE	Cyclotella	97.8	2.09	17.60	46.2	0.05	12.88
BACILLARIOPHYCEAE	Cymatopleura	4.4	0.03	0.03	1.5	0.15	0.54
BACILLARIOPHYCEAE	Cymbella	28.9	0.04	0.19	4.6	0.10	8.76
BACILLARIOPHYCEAE	Entomoneis	2.2	0.08	0.08	0.3	0.73	0.73
BACILLARIOPHYCEAE	Fragilaria	100.0	0.33	4.92	14.3	0.54	12.13
BACILLARIOPHYCEAE	Frustulia	0.0	0.00	0.00	0.8	0.03	5.08
BACILLARIOPHYCEAE	Gomphonema	53.3	0.04	0.16	0.3	0.06	0.06
BACILLARIOPHYCEAE	Gyrosigma	17.8	0.03	0.20	2.6	0.01	0.18
BACILLARIOPHYCEAE	Melosira	86.7	1.42	13.97	0.0	0.00	0.00
BACILLARIOPHYCEAE	Meridion	2.2	0.01	0.01	0.0	0.00	0.00
BACILLARIOPHYCEAE	Navicula	93.3	0.13	1.07	6.4	0.01	0.27
BACILLARIOPHYCEAE	Nitzschia	0.0	0.00	0.00	0.8	0.02	0.09
BACILLARIOPHYCEAE	Pinnularia	0.0	0.00	0.00	0.5	0.06	0.06
BACILLARIOPHYCEAE	Rhizosolenia	2.2	0.10	0.10	0.0	0.00	0.00
BACILLARIOPHYCEAE	Stephanodiscus	20.0	0.79	2.69	9.2	0.39	20.76
BACILLARIOPHYCEAE	Surirella	2.2	0.03	0.03	0.8	0.46	1.08
BACILLARIOPHYCEAE	Synedra	44.4	0.14	5.75	33.9	0.14	25.56
BACILLARIOPHYCEAE	Tabellaria	0.0	0.00	0.00	1.5	0.68	1.01
BACILLARIOPHYCEAE	Urosolenia	0.0	0.00	0.00	0.3	0.04	0.04
CHLOROPHYTA	Actinastrum	91.1	0.28	5.55	4.3	0.06	0.45
CHLOROPHYTA	Ankistrodesmus	97.8	0.01	0.13	4.8	0.07	1.93
CHLOROPHYTA	Chlamydomonas	62.2	0.14	0.94	0.0	0.00	0.00
CHLOROPHYTA	Chodatella	2.2	0.01	0.01	0.0	0.00	0.00
CHLOROPHYTA	Closterium	2.2	0.15	0.15	14.5	0.01	0.43
CHLOROPHYTA	Coelastrum	82.2	0.22	0.97	11.7	0.06	1.18
CHLOROPHYTA	Cosmarium	6.7	0.02	0.04	5.1	0.03	1.61
CHLOROPHYTA	Crucigenia	86.7	0.27	1.22	28.8	0.09	7.90
CHLOROPHYTA	Dictyosphaerium	42.2	1.86	16.53	1.5	0.23	0.61
CHLOROPHYTA	Elakothothrix	13.3	0.22	0.86	11.5	0.01	0.16
CHLOROPHYTA	Eudorina	2.2	0.30	0.30	1.3	0.03	0.06
CHLOROPHYTA	Golenkenia	26.7	0.06	0.57	0.0	0.00	0.00
CHLOROPHYTA	Gonium	0.0	0.00	0.00	0.5	0.03	0.03
CHLOROPHYTA	Kirchneriella	0.0	0.00	0.00	1.8	0.01	0.02
CHLOROPHYTA	Micractinium	42.2	0.27	1.02	0.5	0.04	0.06
CHLOROPHYTA	Mougeoutia	2.2	0.01	0.01	0.0	0.00	0.00
CHLOROPHYTA	Oocystis	82.2	0.30	2.49	16.3	0.13	1.58
CHLOROPHYTA	Pandorina	8.9	1.81	6.34	4.3	0.14	0.64
CHLOROPHYTA	Pediastrum	55.6	0.28	1.19	16.3	0.20	3.14
CHLOROPHYTA	Polyedriopsis	15.6	0.11	0.25	0.0	0.00	0.00
CHLOROPHYTA	Scenedesmus	95.6	0.65	4.13	41.3	0.05	5.24
CHLOROPHYTA	Schroederia	31.1	0.01	0.03	42.9	0.01	0.15
CHLOROPHYTA	Selenastrum	97.8	0.01	0.08	0.0	0.00	0.00
CHLOROPHYTA	Sphaerocystis	0.0	0.00	0.00	6.4	0.16	2.28
CHLOROPHYTA	Staurastrum	35.6	0.06	0.26	12.2	0.02	0.34
CHLOROPHYTA	Tetraedron	46.7	0.09	0.38	2.0	0.02	0.40
CHLOROPHYTA	Tetraselmis	11.1	0.07	0.13	0.0	0.00	0.00
CHLOROPHYTA	Tetrastrum	8.9	0.04	0.06	0.0	0.00	0.00
CHLOROPHYTA	Treubaria	20.0	0.11	0.56	0.0	0.00	0.00
CHLOROPHYTA	Volvox	0.0	0.00	0.00	0.3	585.98	585.98
CHRYSOSOPHAERELLA	Dinobryon	11.1	0.15	0.42	11.7	0.14	11.63
CHRYSOSOPHAERELLA	Mallomonas	26.7	0.04	0.18	9.9	0.04	0.33
CHRYSOSOPHAERELLA	Unknown Chrysophyte	2.2	0.02	0.02	0.0	0.00	0.00
CRYPTOPHYTA	Chroomonas	86.7	0.06	0.46	0.0	0.00	0.00
CRYPTOPHYTA	Cryptomonas	97.8	0.41	1.42	91.1	0.16	18.07

Appendix 14 (continued). Summary of phytoplankton taxa observed in 45 stream and 392 lake samples collected during summer 2011.

Taxa Division	Genus/Taxa	Stream Samples			Lake Samples		
		Frequency (%)	Median Wetmass (mg/L)	Maximum Wetmass (mg/L)	Frequency (%)	Median Wetmass (mg/L)	Maximum Wetmass (mg/L)
CYANOBACTERIA	Anabaena	24.4	0.36	2.50	53.6	0.30	12.08
CYANOBACTERIA	Anabaenopsis	2.2	0.14	0.14	0.0	0.00	0.00
CYANOBACTERIA	Aphanizomenon	6.7	0.15	0.68	61.5	1.99	85.60
CYANOBACTERIA	Aphanocapsa	77.8	1.51	50.11	0.0	0.00	0.00
CYANOBACTERIA	Aphanothece	2.2	1.40	1.40	0.0	0.00	0.00
CYANOBACTERIA	Chroococcus	20.0	0.05	0.11	26.5	0.09	7.86
CYANOBACTERIA	Coelosphaerium	2.2	1.27	1.27	9.4	2.24	38.46
CYANOBACTERIA	Cylindrospermopsis	4.4	0.16	0.28	12.2	0.29	13.85
CYANOBACTERIA	Limnothrix	68.9	0.03	1.38	0.0	0.00	0.00
CYANOBACTERIA	Lyngbya	0.0	0.00	0.00	2.0	0.18	0.67
CYANOBACTERIA	Merismopedia	88.9	0.63	15.43	8.9	0.09	5.03
CYANOBACTERIA	Microcystis	68.9	1.31	75.05	100.0	7.64	417.72
CYANOBACTERIA	Oscillatoria	0.0	0.00	0.00	13.0	1.03	49.99
CYANOBACTERIA	Planktolyngbya	35.6	0.01	1.03	25.8	1.46	168.40
CYANOBACTERIA	Planktothrix	64.4	0.44	13.83	0.0	0.00	0.00
CYANOBACTERIA	Pseudanabaena	28.9	0.01	0.44	0.0	0.00	0.00
DINOPHYCEAE	Ceratium	0.0	0.00	0.00	13.0	1.24	12.82
DINOPHYCEAE	Glenodinium	4.4	0.01	0.02	0.0	0.00	0.00
DINOPHYCEAE	Peridinium	20.0	0.03	0.09	3.3	0.12	1.82
EUGLENOPHYTA	Euglena	31.1	0.27	1.97	19.6	0.08	3.44
EUGLENOPHYTA	Phacus	4.4	0.17	0.29	3.1	0.38	1.04
EUGLENOPHYTA	Trachellomonas	8.9	0.03	0.07	51.3	0.05	4.99
PROTOZOA	Misc. Protozoa	97.8	0.95	6.23	0.0	0.00	0.00

Appendix 15(a). Abbreviations for BMIBI and FIBI metrics.

BMIBI – Benthic Macroinvertebrate Index of Biotic Integrity

MHEPTX – multi-habitat number of EPT (Epemeroptera, Plecoptera, Trichoptera) taxa

MHSNSTV - multi-habitat number of sensitive taxa

MHTTX – multi-habitat number of total taxa

SHCHIR – standard habitat percent abundance Chironomidae taxa

SHDFFG – standard habitat percent abundance dominant functional feeding group

SHEPHM – standard habitat percent abundance Ephemeroptera taxa

SHEPTX – standard habitat number of EPT (Epemeroptera, Plecoptera, Trichoptera) taxa

SHMHBI – standard habitat modified Hilsenhoff biotic index

SHP3DOM – standard habitat percent abundance top three dominant taxa

SHPEPT – standard habitat number of EPT taxa

SHSCRPR – standard habitat percent abundance scraper organisms

SHTTX – standard habitat number of total taxa

FIBI – Fish Index of Biotic Integrity

ACPUE – fish adjusted catch per unit effort

BINVSP – number of benthic invertivore fish species

NTVSP – number of native fish species

P3ABUND – percent abundance top three dominant fish species

PBINV – percent abundance benthic invertivore fish species

PDELT – percent abundance fish with deformities (D), eroded fins (E), Lesions (L), Tumors (T)

POMNV – percent abundance omnivore fish species

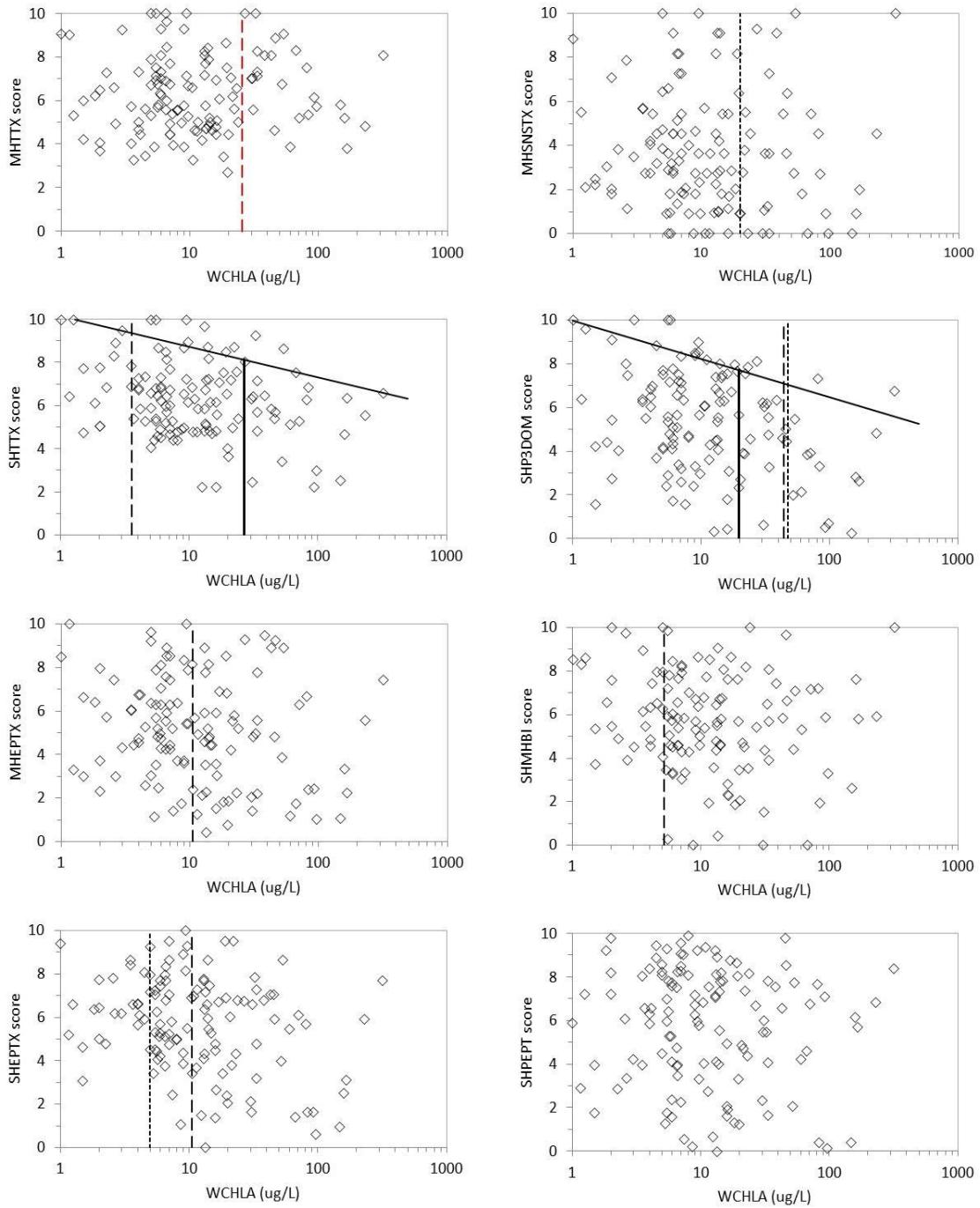
PSLITH – percent abundance simple lithophil fish species

PTOPC – percent abundance top carnivore fish species

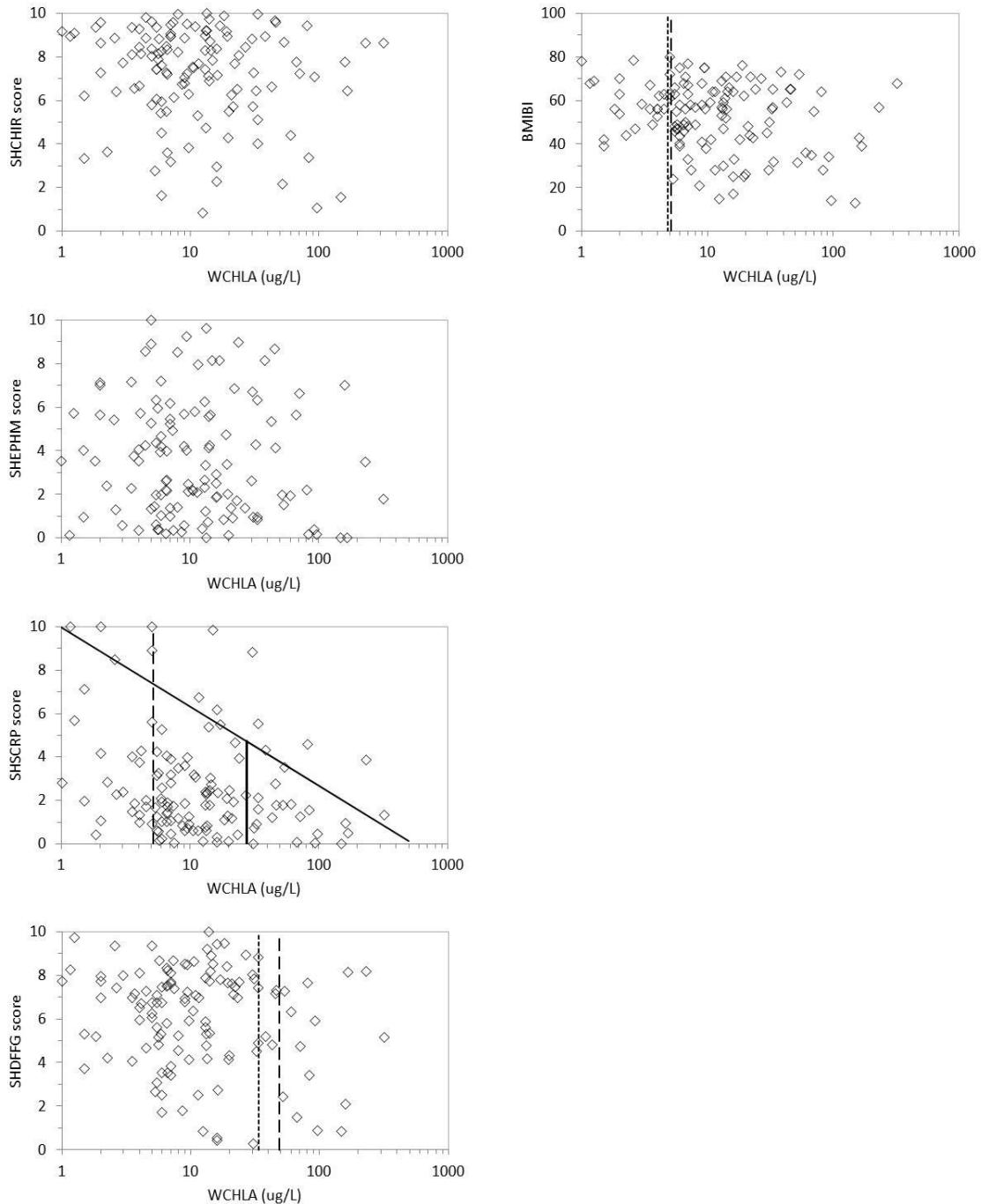
SCKRSP – number of sucker fish species

SNSTVSP – number of sensitive fish species

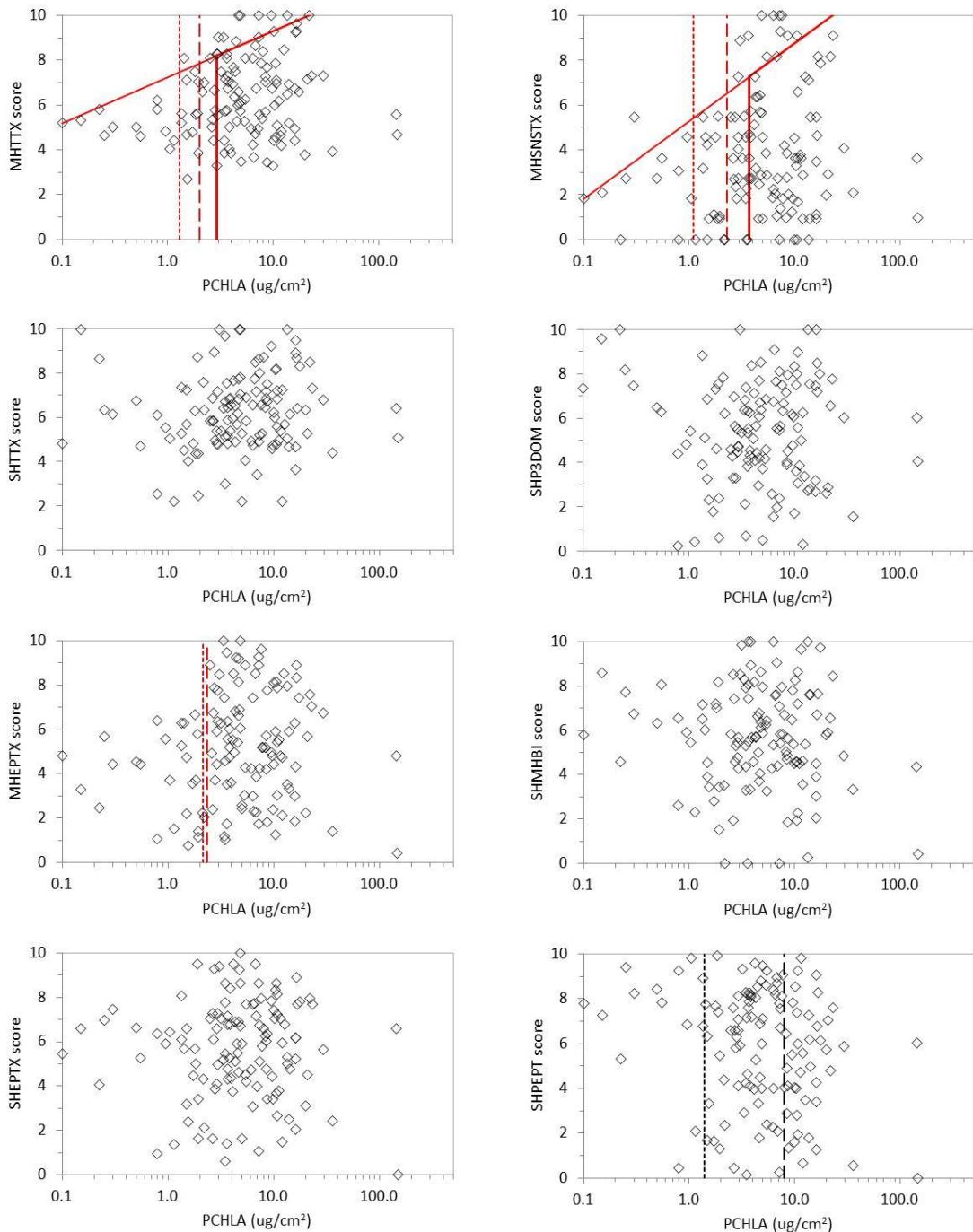
TOLINDX – fish species tolerance index



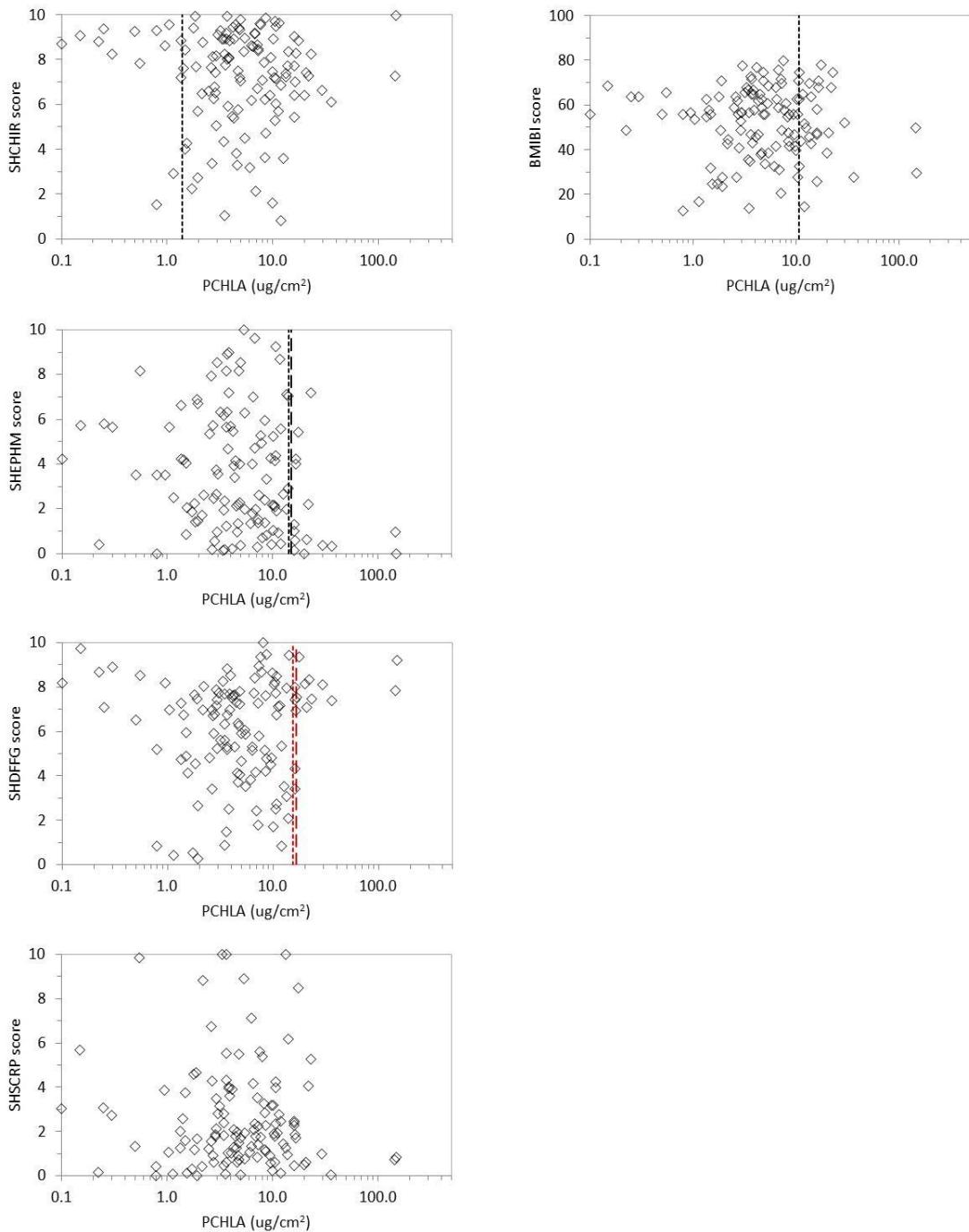
Appendix 15(b). Component metrics of the Benthic Macroinvertebrate Index of Biotic Integrity (BMIBI) plotted against seston chlorophyll A (WCHLA). Metric abbreviations are given in Appendix 15(a). Stressor-response breakpoint/threshold analysis results are displayed as vertical lines: Conditional Probability breakpoint (vertical, short dashed); Quantile Regression threshold (vertical, thick solid); Quantile Regression 90th percentile regression (sloping, thin solid) Regression Tree (RT) breakpoint (vertical, long dashed). A red line indicates the metric response was opposite of predicted (i.e. overall metric scores improved with increasing WCHLA levels).



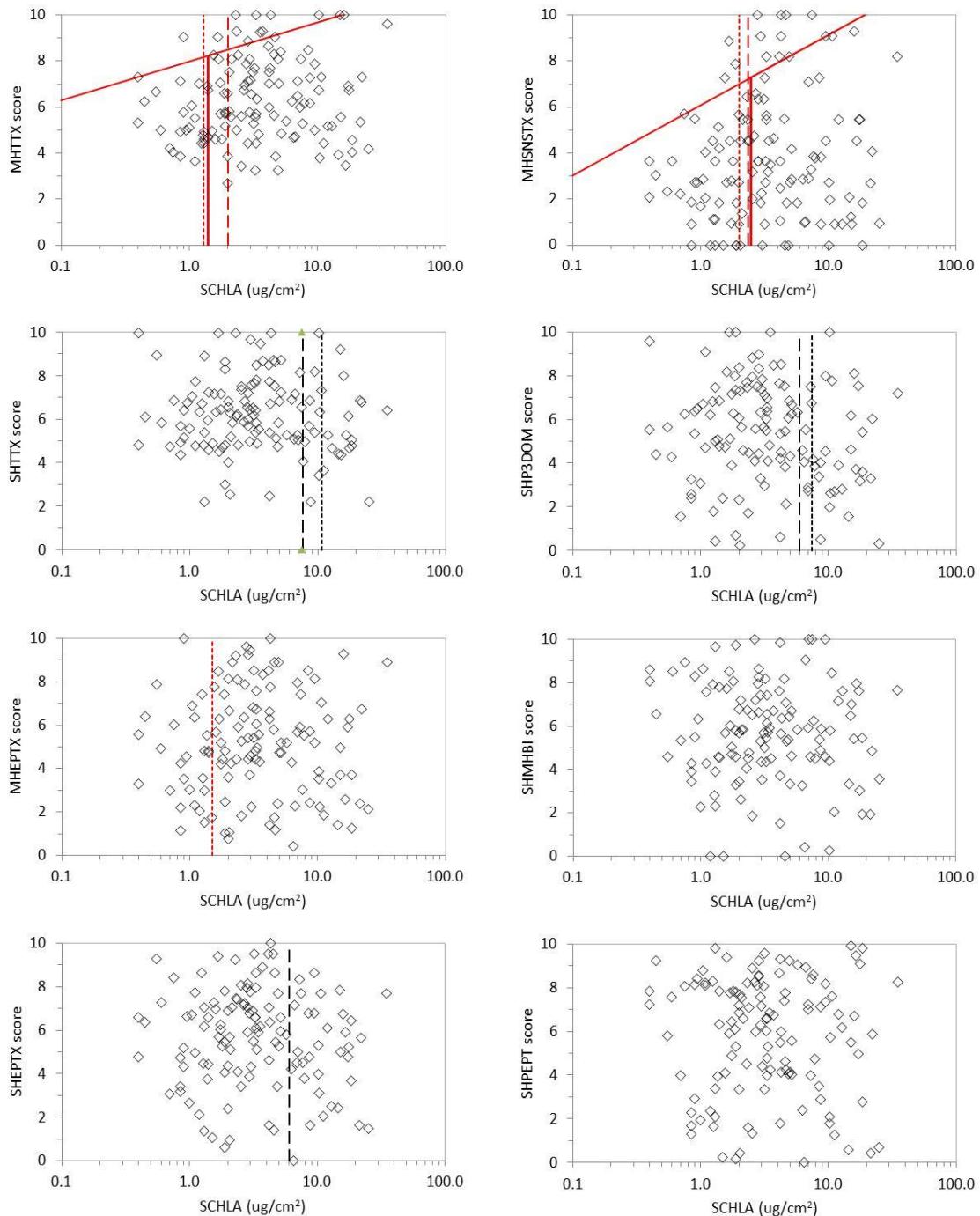
Appendix 15(b) (continued). Component metrics of the Benthic Macroinvertebrate Index of Biotic Integrity (BMIBI) plotted against seston chlorophyll A (WCHLA). Metric abbreviations are given in Appendix 15(a). Stressor-response breakpoint/threshold analysis results are displayed as vertical lines: Conditional Probability breakpoint (vertical, short dashed); Quantile Regression threshold (vertical, thick solid); Quantile Regression 90th percentile regression (sloping, thin solid) Regression Tree (RT) breakpoint (vertical, long dashed). A red line indicates the metric response was opposite of predicted (i.e. overall metric scores improved with increasing WCHLA levels).



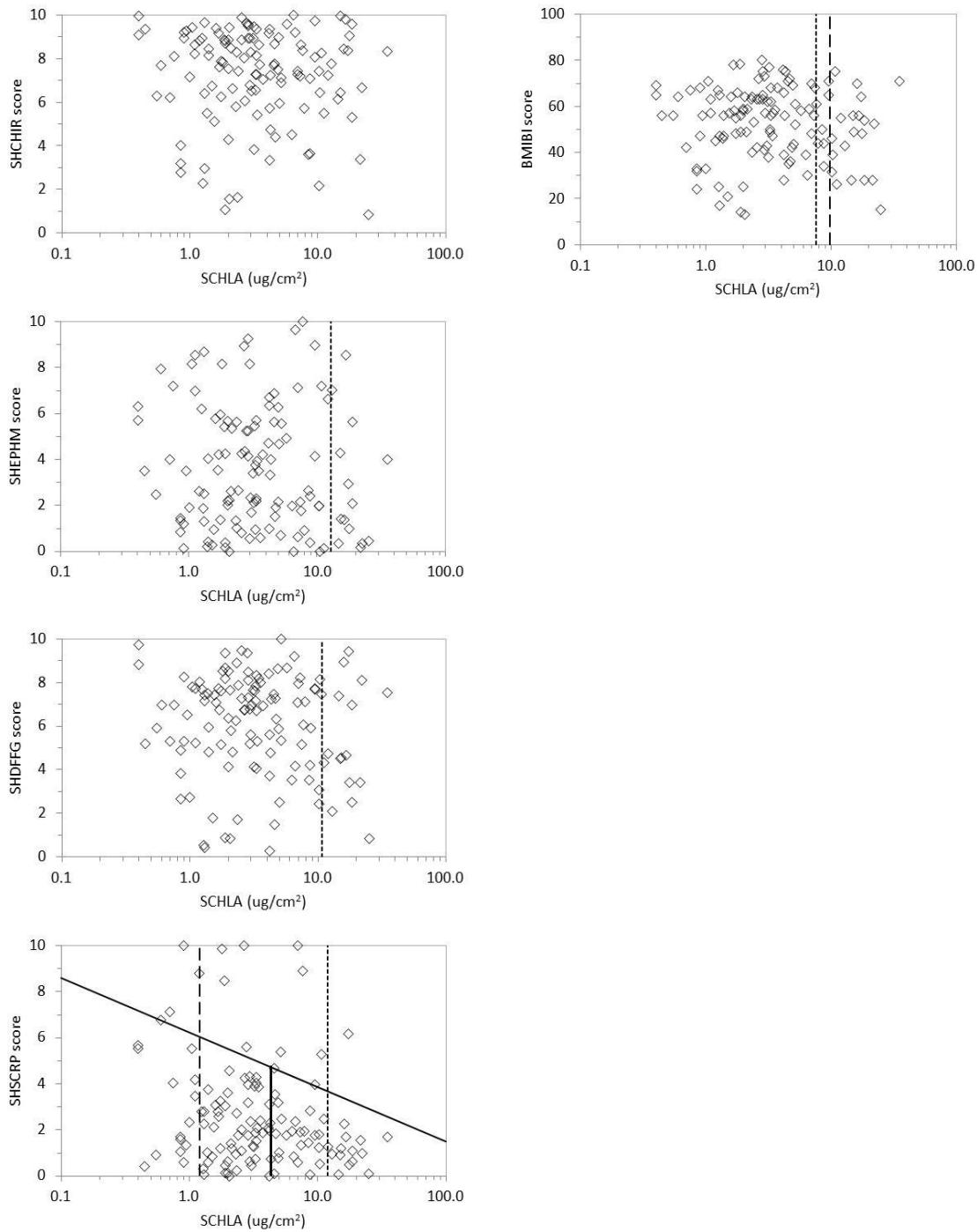
Appendix 15(c). Component metrics of the Benthic Macroinvertebrate Index of Biotic Integrity (BMIBI) plotted against periphyton chlorophyll A (PCHLA). Metric abbreviations are given in Appendix 15(a). Stressor-response breakpoint/threshold analysis results are displayed as vertical lines: Conditional Probability breakpoint (vertical, short dashed); Quantile Regression threshold (vertical, thick solid); Quantile Regression 90th percentile regression (sloping, thin solid) Regression Tree (RT) breakpoint (vertical, long dashed). A red line indicates the metric response was opposite of predicted (i.e. overall metric scores improved with increasing PCHLA levels).



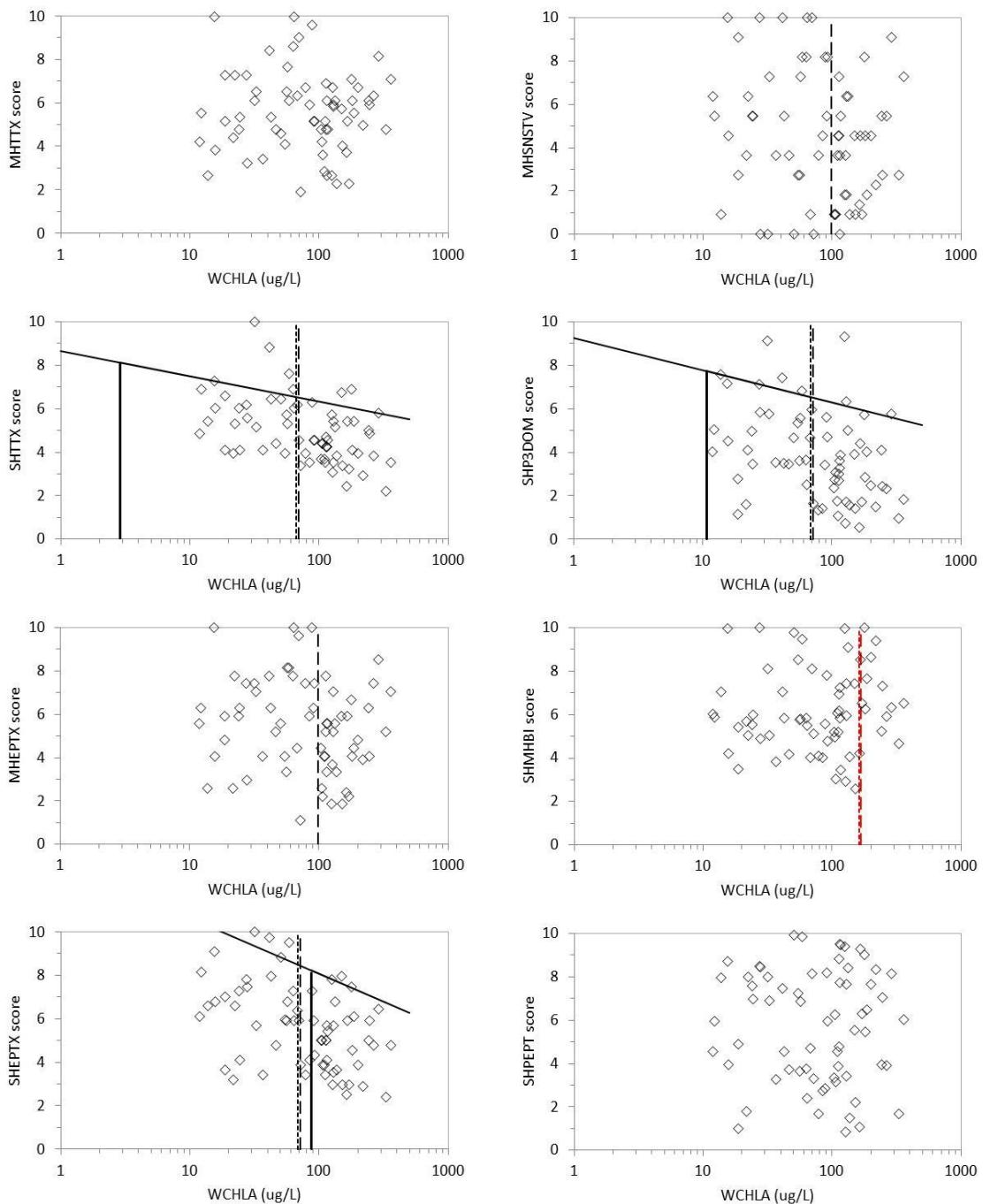
Appendix 15(c) (continued). Component metrics of the Benthic Macroinvertebrate Index of Biotic Integrity (BMIBI) plotted against periphyton chlorophyll A (PCHLA). Metric abbreviations are given in Appendix 15(a). Stressor-response breakpoint/threshold analysis results are displayed as vertical lines: Conditional Probability breakpoint (vertical, short dashed); Quantile Regression threshold (vertical, thick solid); Quantile Regression 90th percentile regression (sloping, thin solid) Regression Tree (RT) breakpoint (vertical, long dashed). A red line indicates the metric response was opposite of predicted (i.e. overall metric scores improved with increasing PCHLA levels).



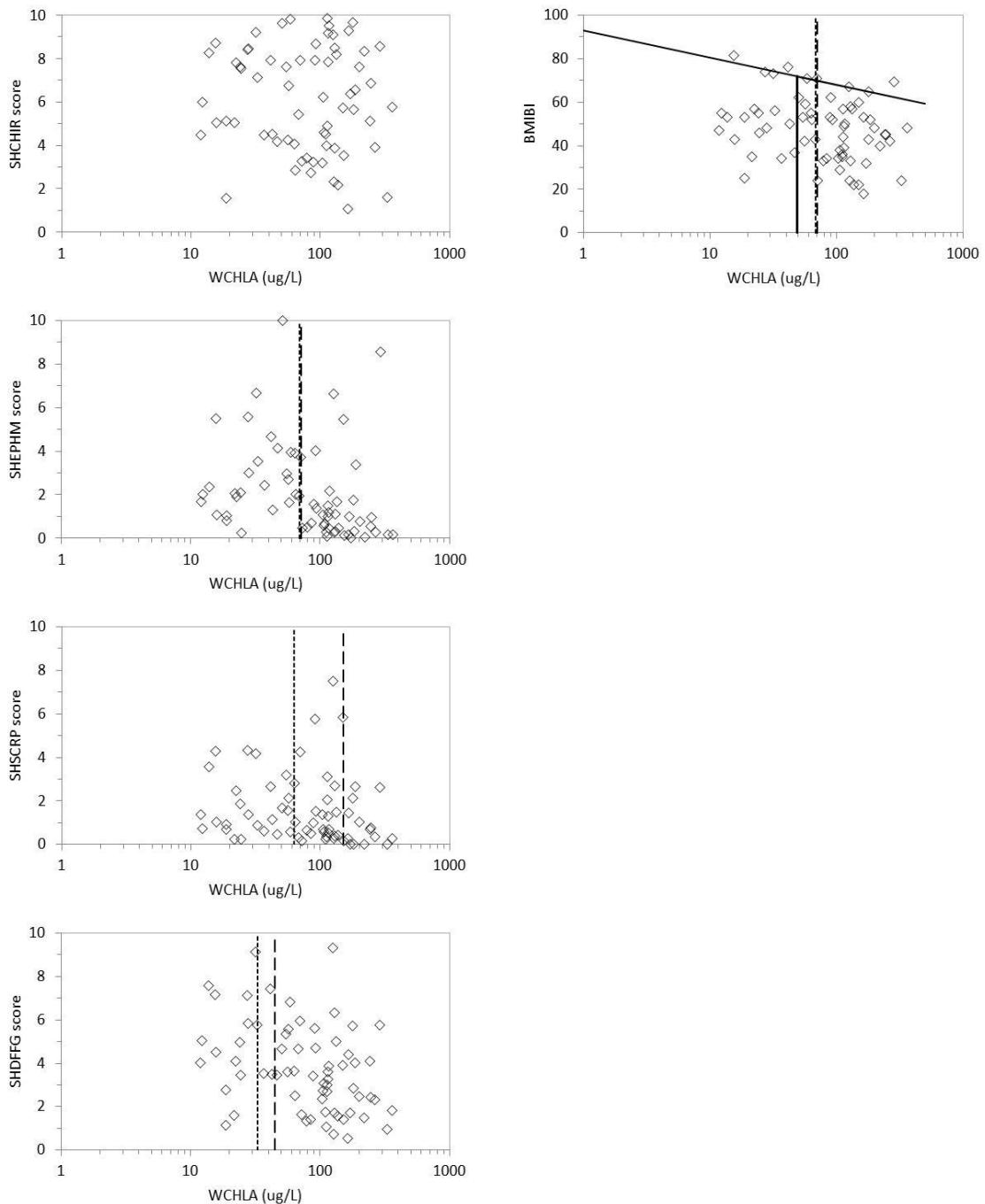
Appendix 15(d). Component metrics of the Benthic Macroinvertebrate Index of Biotic Integrity (BMIBI) plotted against sediment chlorophyll A (SCHLA). Metric abbreviations are given in Appendix 15(a). Stressor-response breakpoint/threshold analysis results are displayed as vertical lines: Conditional Probability breakpoint (vertical, short dashed); Quantile Regression threshold (vertical, thick solid); Quantile Regression 90th percentile regression (sloping, thin solid) Regression Tree (RT) breakpoint (vertical, long dashed). A red line indicates the metric response was opposite of predicted (i.e. overall metric scores improved with increasing PCHLA levels).



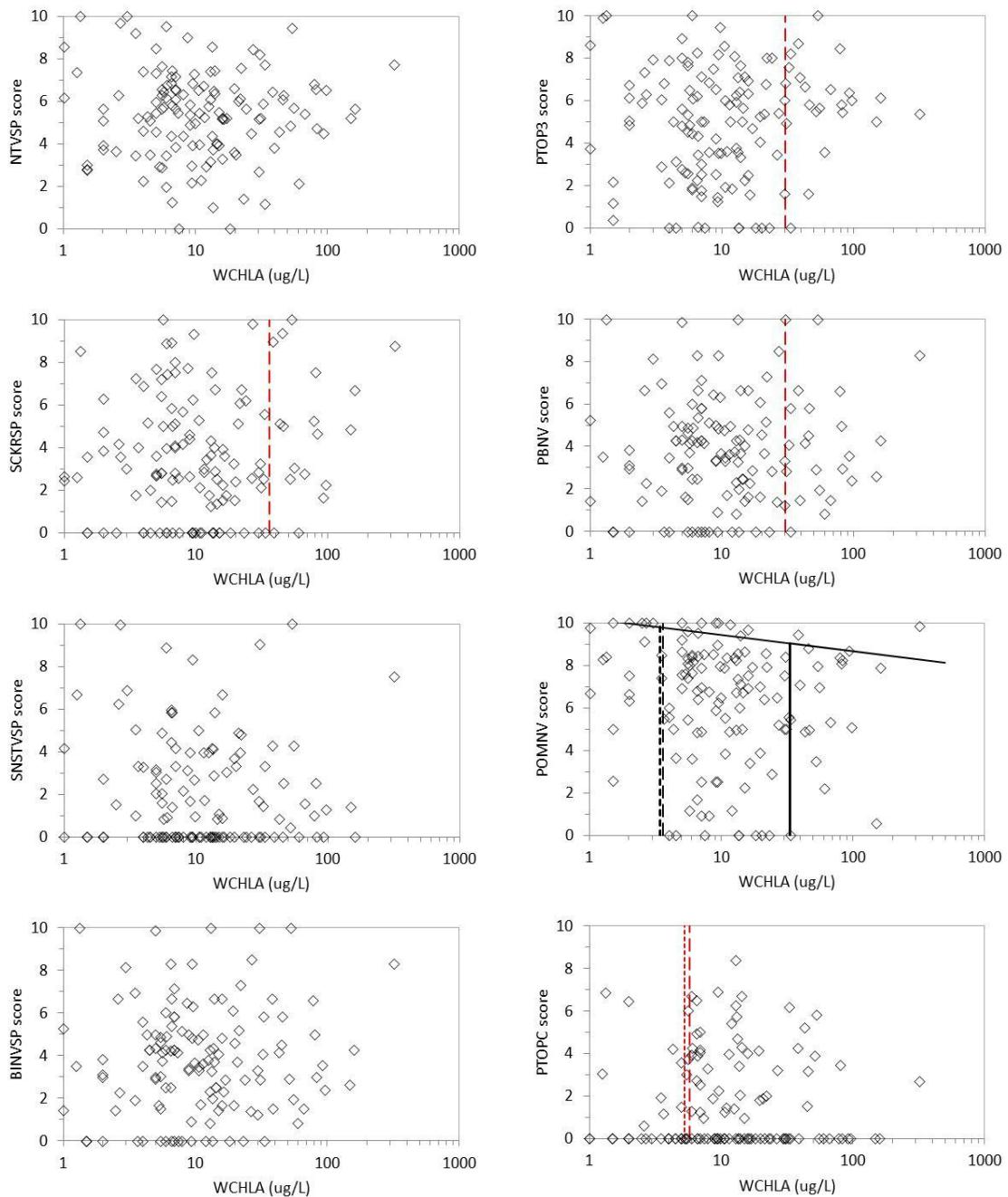
Appendix 15(d) (continued). Component metrics of the Benthic Macroinvertebrate Index of Biotic Integrity (BMIBI) plotted against sediment chlorophyll A (SCHLA). Metric abbreviations are given in Appendix 15(a). Stressor-response breakpoint/threshold analysis results are displayed as vertical lines: Conditional Probability breakpoint (vertical, short dashed); Quantile Regression threshold (vertical, thick solid); Quantile Regression 90th percentile regression (sloping, thin solid) Regression Tree (RT) breakpoint (vertical, long dashed). A red line indicates the metric response was opposite of predicted (i.e. overall metric scores improved with increasing PCHLA levels).



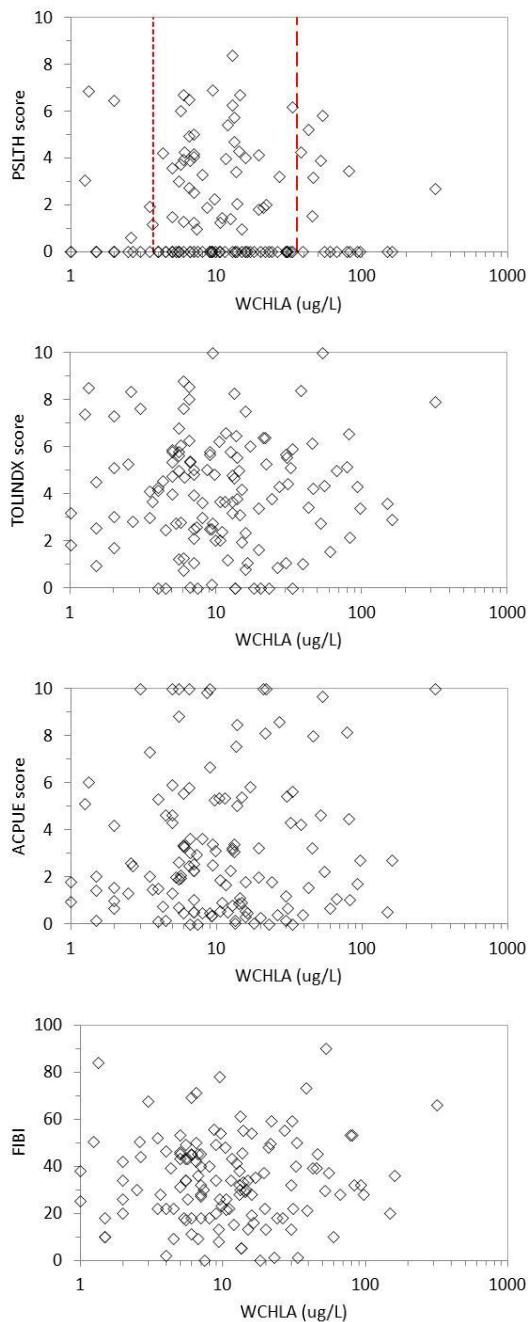
Appendix 15(e). Component metrics of the Benthic Macroinvertebrate Index of Biotic Integrity (BMIBI) plotted against sestonic chlorophyll A (WCHLA). Data were obtained from nonwadeable streams of watershed area  $\geq$  700 square miles. Metric abbreviations are given in Appendix 15(a). Stressor-response breakpoint/threshold analysis results are displayed as vertical lines: Conditional Probability breakpoint (vertical, short dashed); Quantile Regression threshold (vertical, thick solid); Quantile Regression 90th percentile regression (sloping, thin solid) Regression Tree (RT) breakpoint (vertical, long dashed). A red line indicates the metric response was opposite of predicted (i.e. overall metric scores improved with increasing WCHLA levels).



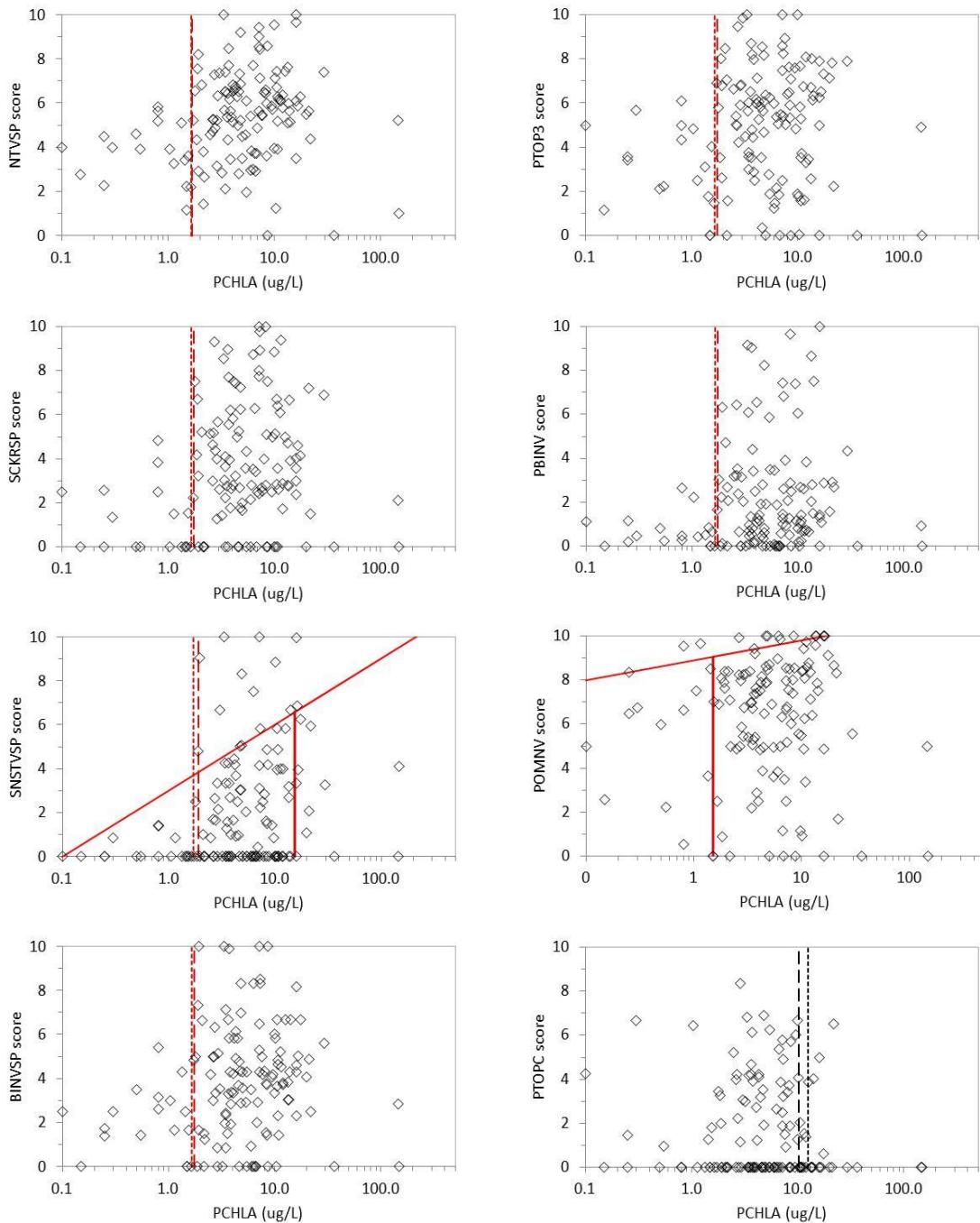
Appendix 15(e) (continued). Component metrics of the Benthic Macroinvertebrate Index of Biotic Integrity (BMIBI) plotted against sestonic chlorophyll A (WCHLA). Data were obtained from nonwadeable streams of watershed area  $\geq$  700 square miles. Metric abbreviations are given in Appendix 15(a). Stressor-response breakpoint/threshold analysis results are displayed as vertical lines: Conditional Probability breakpoint (vertical, short dashed); Quantile Regression threshold (vertical, thick solid); Quantile Regression 90th percentile regression (sloping, thin solid) Regression Tree (RT) breakpoint (vertical, long dashed). A red line indicates the metric response was opposite of predicted (i.e. overall metric scores improved with increasing WCHLA levels).



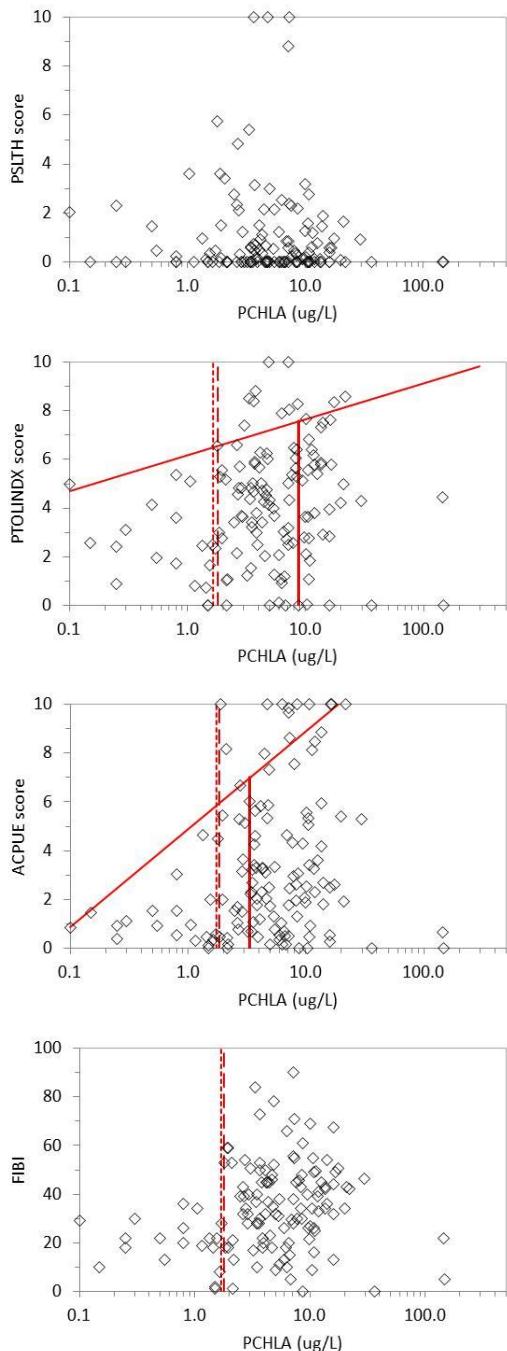
Appendix 15(f). Component metrics of the Fish Index of Biotic Integrity (FIBI) plotted against seston chlorophyll A (WCHLA). Metric abbreviations are given in Appendix 15(a). Stressor-response breakpoint/threshold analysis results are displayed as vertical lines: Conditional Probability breakpoint (vertical, short dashed); Quantile Regression threshold (vertical, thick solid); Quantile Regression 90th percentile regression (sloping, thin solid) Regression Tree (RT) breakpoint (vertical, long dashed). A red line indicates the metric response was opposite of predicted (i.e. overall metric scores improved with increasing WCHLA levels).



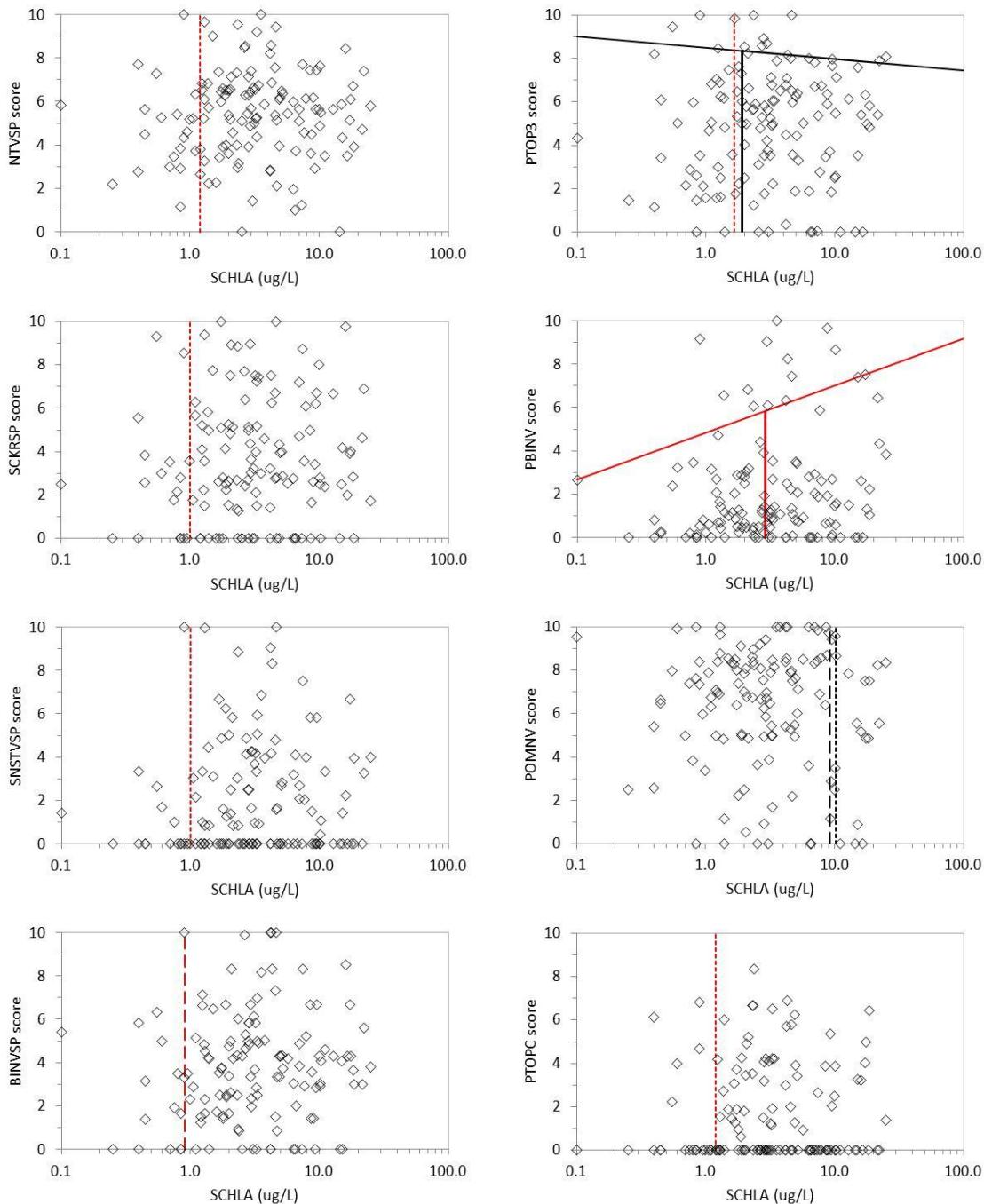
Appendix 15(f) (continued). Component metrics of the Fish Index of Biotic Integrity (FIBI) plotted against seston chlorophyll A (WCHLA). Metric abbreviations are given in Appendix 15(a). Stressor-response breakpoint/threshold analysis results are displayed as vertical lines: Conditional Probability breakpoint (vertical, short dashed); Quantile Regression threshold (vertical, thick solid); Quantile Regression 90th percentile regression (sloping, thin solid) Regression Tree (RT) breakpoint (vertical, long dashed). A red line indicates the metric response was opposite of predicted (i.e. overall metric scores improved with increasing WCHLA levels).



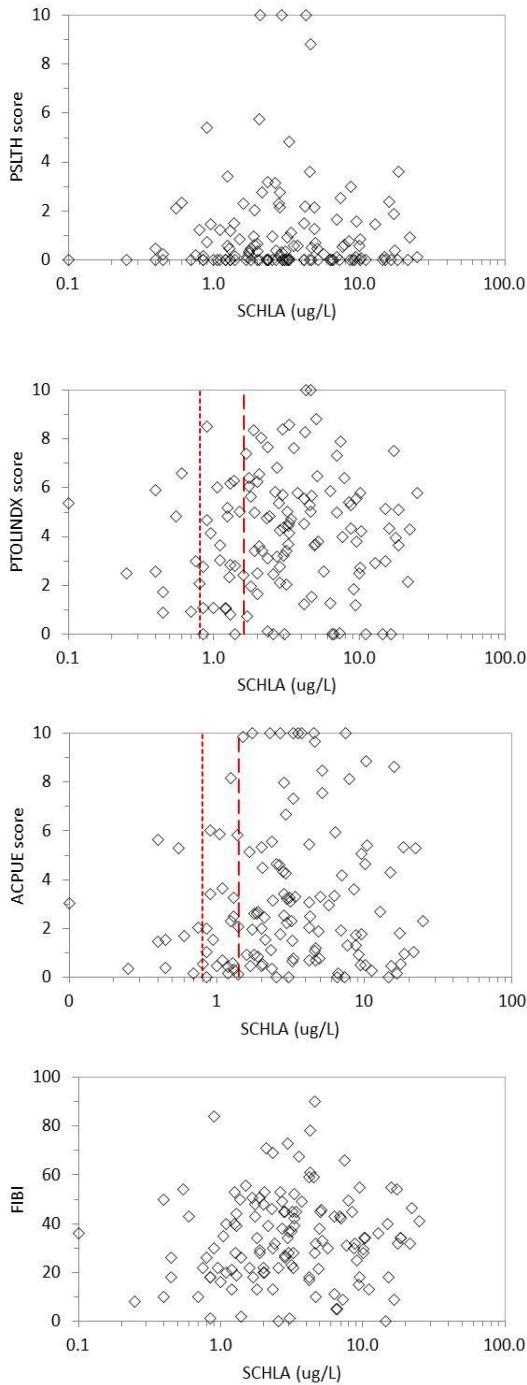
Appendix 15(g). Component metrics of the Fish Index of Biotic Integrity (FIBI) plotted against periphyton chlorophyll A (PCHLA). Metric abbreviations are given in Appendix 15(a). Stressor-response breakpoint/threshold analysis results are displayed as vertical lines: Conditional Probability breakpoint (vertical, short dashed); Quantile Regression threshold (vertical, thick solid); Quantile Regression 90th percentile regression (sloping, thin solid) Regression Tree (RT) breakpoint (vertical, long dashed). A red line indicates the metric response was opposite of predicted (i.e. overall metric scores improved with increasing PCHLA levels).



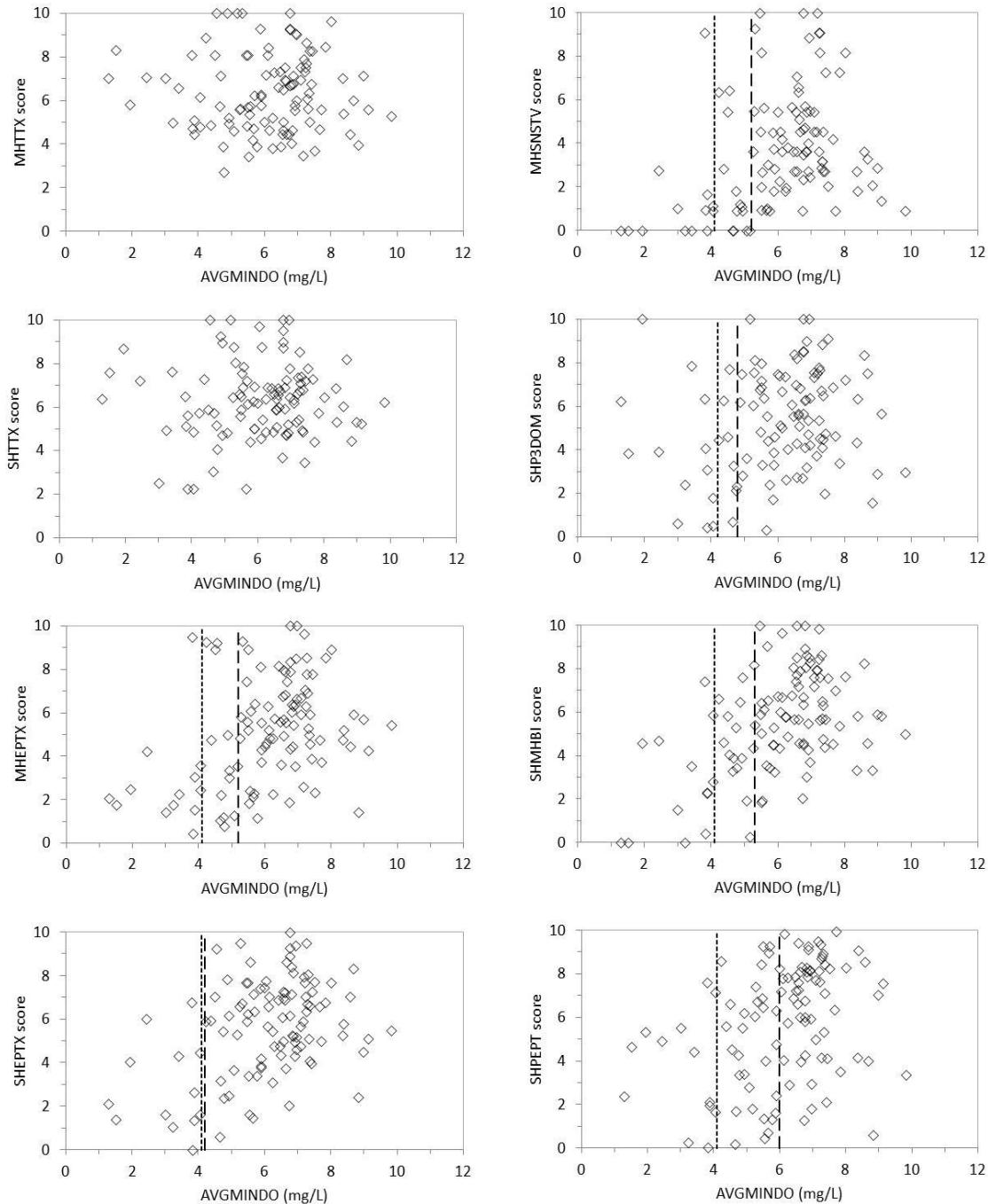
Appendix 15(g) (continued). Component metrics of the Fish Index of Biotic Integrity (BMIBI) plotted against periphyton chlorophyll A (PCHLA). Metric abbreviations are given in Appendix 15(a). Stressor-response breakpoint/threshold analysis results are displayed as vertical lines: Conditional Probability breakpoint (vertical, short dashed); Quantile Regression threshold (vertical, thick solid); Quantile Regression 90th percentile regression (sloping, thin solid) Regression Tree (RT) breakpoint (vertical, long dashed). A red line indicates the metric response was opposite of predicted (i.e. overall metric scores improved with increasing PCHLA levels).



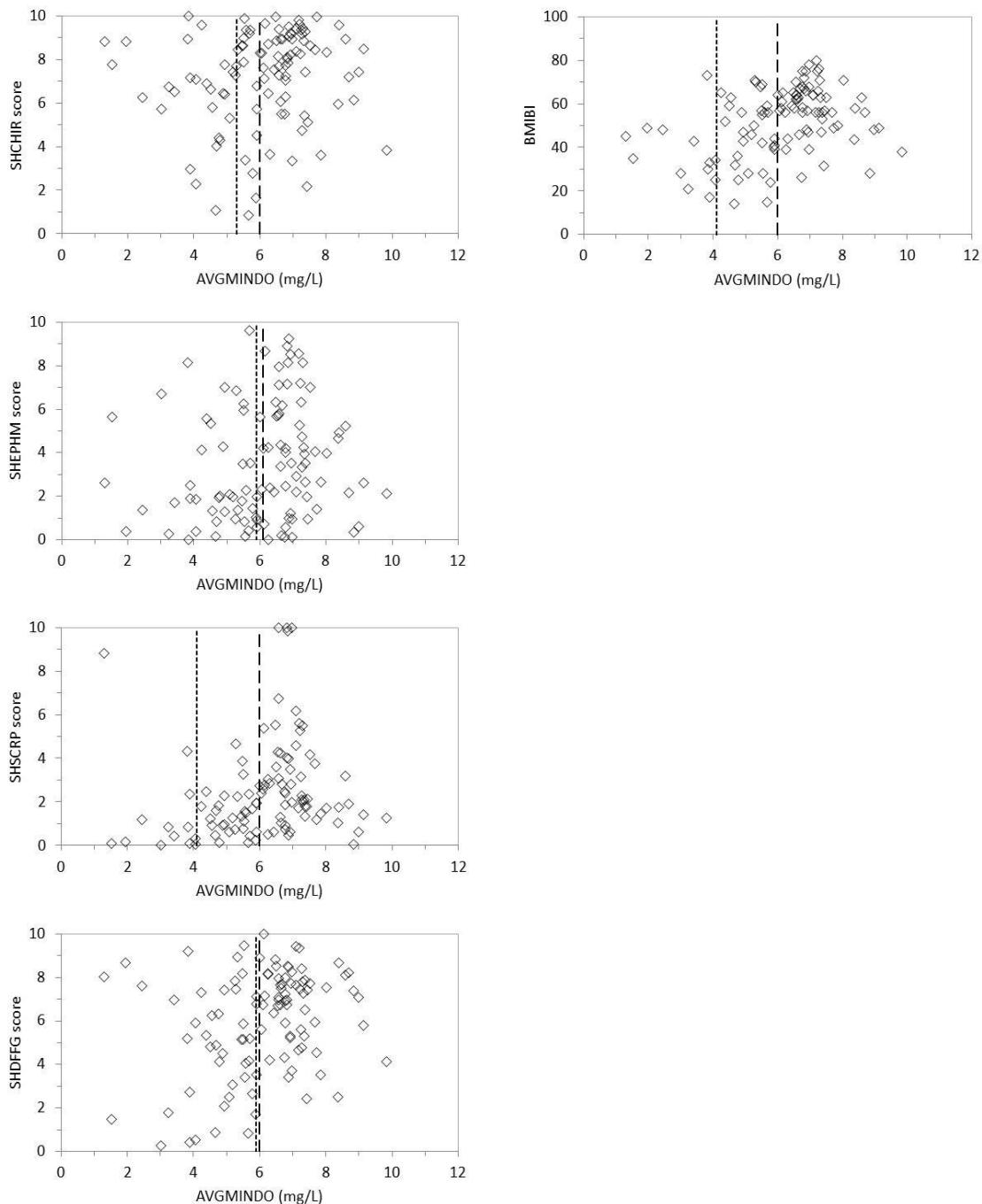
Appendix 15(h). Component metrics of the Fish Index of Biotic Integrity (FBI) plotted against sediment chlorophyll A (SCHLA). Metric abbreviations are given in Appendix 15(a). Stressor-response breakpoint/threshold analysis results are displayed as vertical lines: Conditional Probability breakpoint (vertical, short dashed); Quantile Regression threshold (vertical, thick solid); Quantile Regression 90th percentile regression (sloping, thin solid) Regression Tree (RT) breakpoint (vertical, long dashed). A red line indicates the metric response was opposite of predicted (i.e. overall metric scores improved with increasing SCHLA levels).



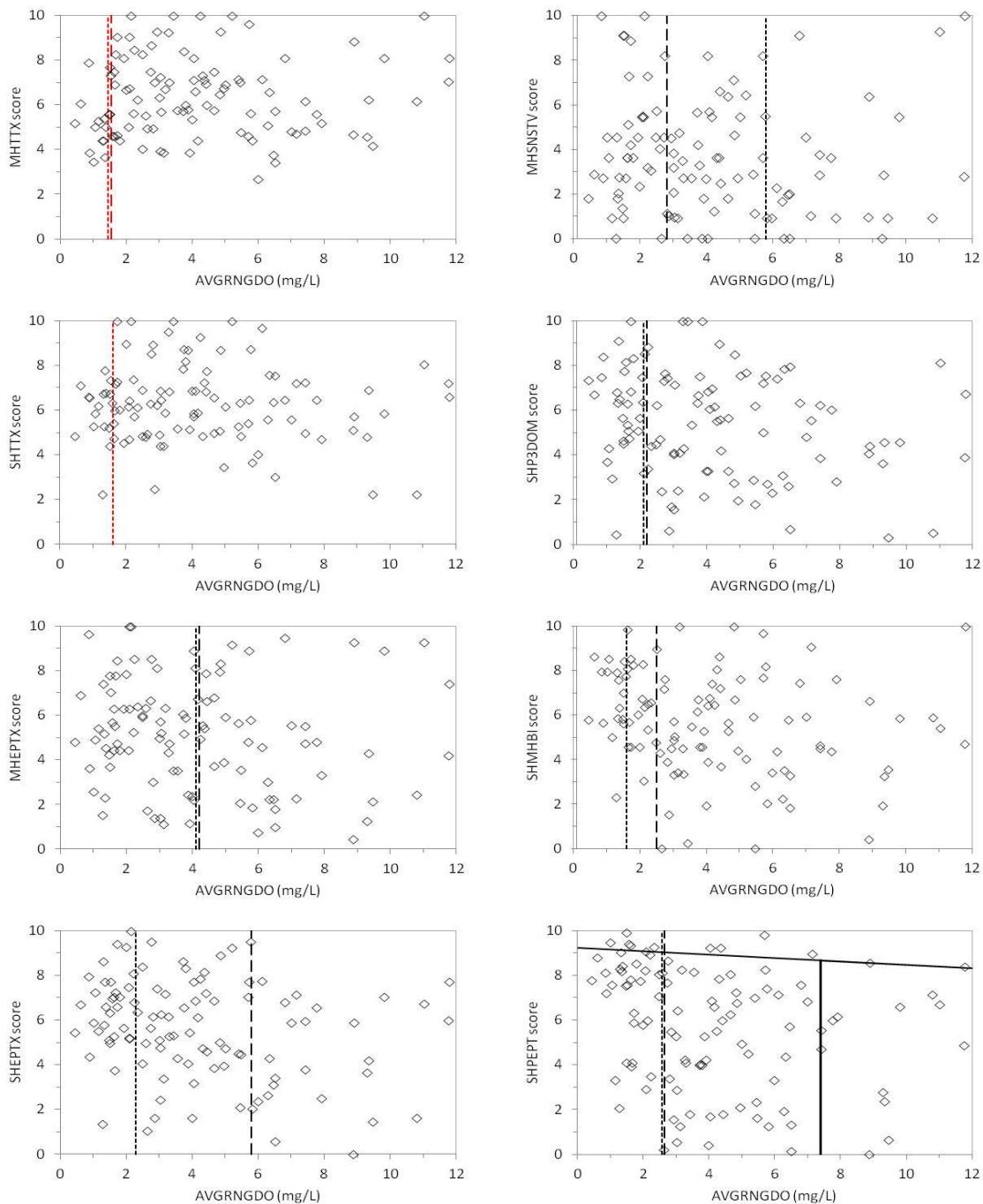
Appendix 15(h) (continued). Component metrics of the Fish Index of Biotic Integrity (FIBI) plotted against sediment chlorophyll A (SCHLA). Metric abbreviations are given in Appendix 15(a). Stressor-response breakpoint/threshold analysis results are displayed as vertical lines: Conditional Probability breakpoint (vertical, short dashed); Quantile Regression threshold (vertical, thick solid); Quantile Regression 90th percentile regression (sloping, thin solid) Regression Tree (RT) breakpoint (vertical, long dashed). A red line indicates the metric response was opposite of predicted (i.e. overall metric scores improved with increasing SCHLA levels).



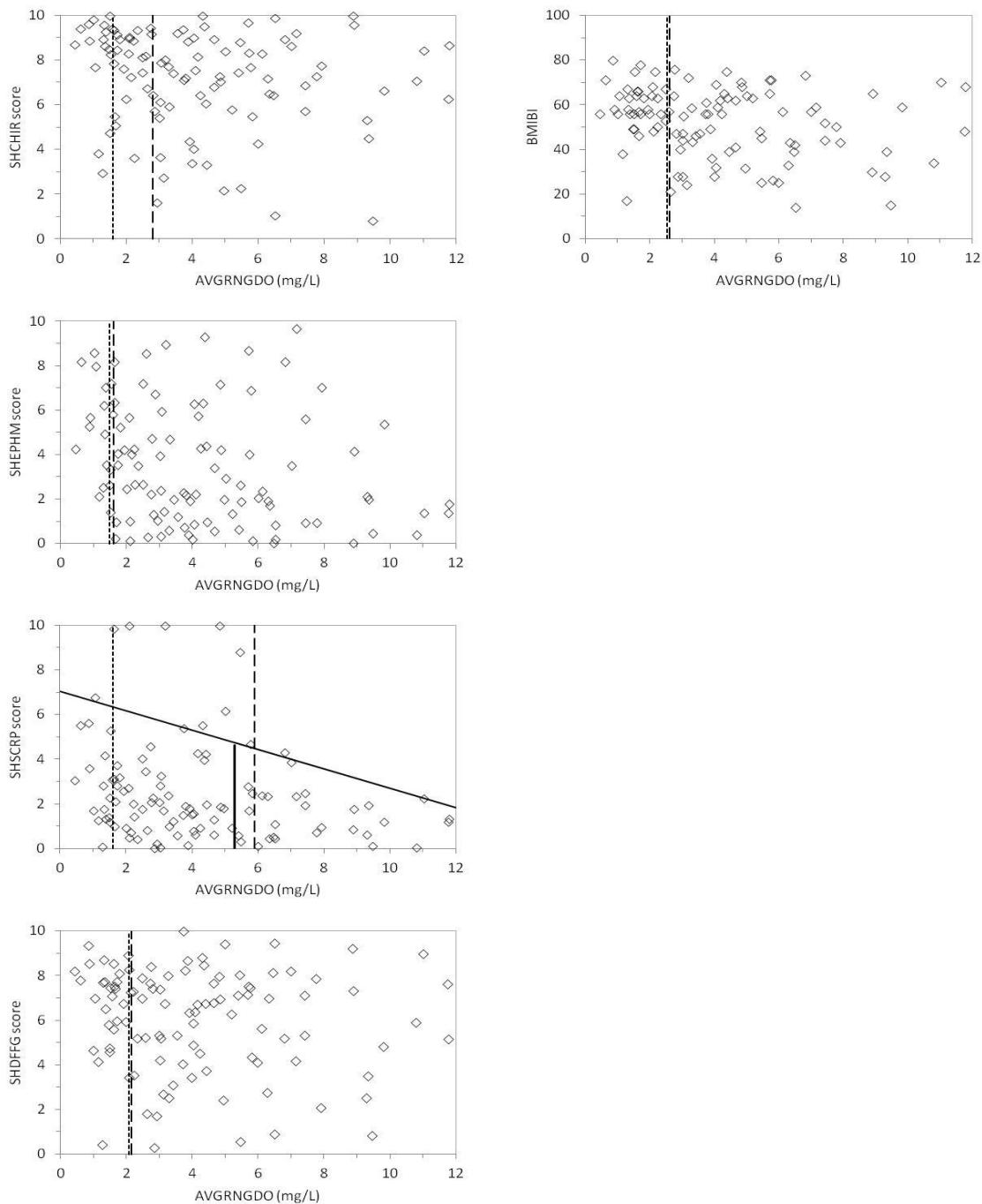
Appendix 15(i). Component metrics of the Benthic Macroinvertebrate Index of Biotic Integrity (BMIBI) plotted against average diel dissolved oxygen minima (AVGMINDO). Metric abbreviations are given in Appendix 15(a). Stressor-response breakpoint/threshold analysis results are displayed as vertical lines: Conditional Probability breakpoint (vertical, short dashed); Quantile Regression threshold (vertical, thick solid); Quantile Regression 90th percentile regression (sloping, thin solid) Regression Tree (RT) breakpoint (vertical, long dashed). A red line indicates the metric response was opposite of predicted (i.e. overall metric scores improved with decreasing AVGMINDO levels).



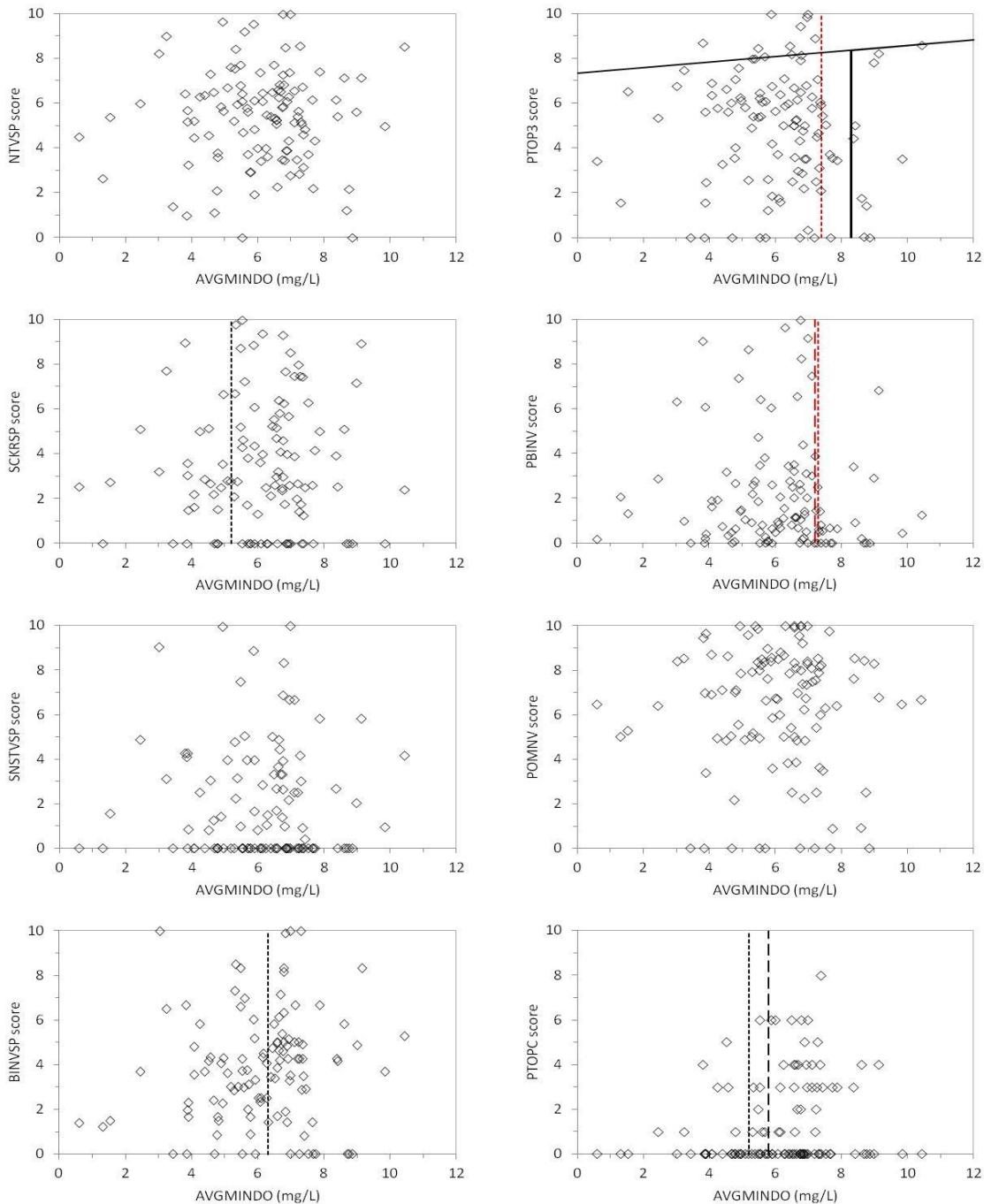
Appendix 15(i) (continued). Component metrics of the Benthic Macroinvertebrate Index of Biotic Integrity (BMIBI) plotted against average diel dissolved oxygen minima (AVGMINDO). Metric abbreviations are given in Appendix 15(a). Stressor-response breakpoint/threshold analysis results are displayed as vertical lines: Conditional Probability breakpoint (vertical, short dashed); Quantile Regression threshold (vertical, thick solid); Quantile Regression 90th percentile regression (sloping, thin solid) Regression Tree (RT) breakpoint (vertical, long dashed). A red line indicates the metric response was opposite of predicted (i.e. overall metric scores improved with decreasing AVGMINDO levels).



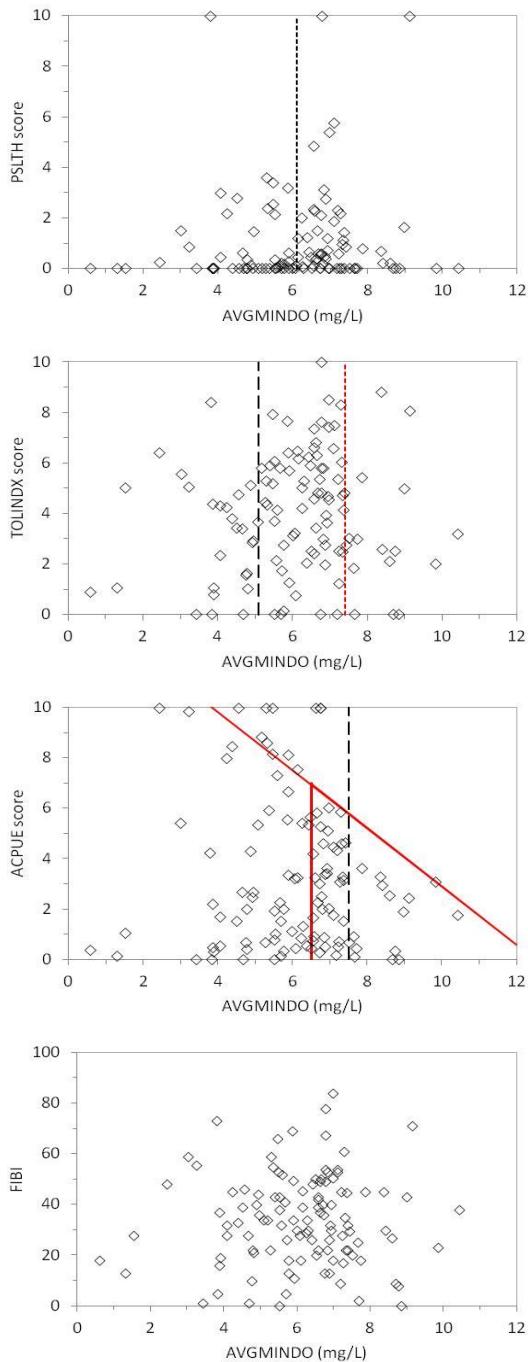
Appendix 15(j) (continued). Component metrics of the Benthic Macroinvertebrate Index of Biotic Integrity (BMIBI) plotted against average diel dissolved oxygen range (AVGRNGDO). Metric abbreviations are given in Appendix 15(a). Stressor-response breakpoint/threshold analysis results are displayed as vertical lines: Conditional Probability breakpoint (vertical, short dashed); Quantile Regression threshold (vertical, thick solid); Quantile Regression 90th percentile regression (sloping, thin solid) Regression Tree (RT) breakpoint (vertical, long dashed). A red line indicates the metric response was opposite of predicted (i.e. overall metric scores improved with decreasing AVGRNGDO levels).



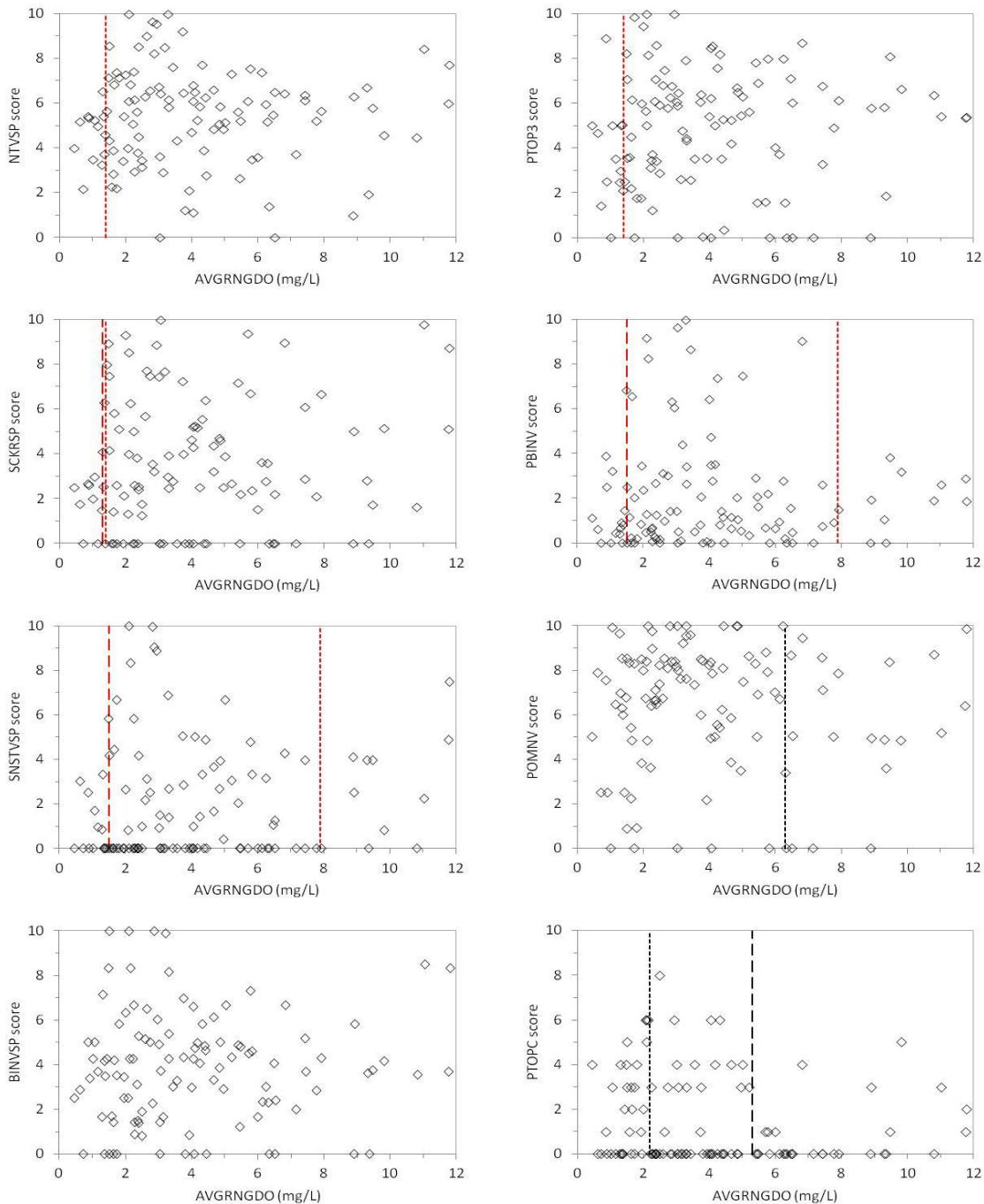
Appendix 15(j) (continued). Component metrics of the Benthic Macroinvertebrate Index of Biotic Integrity (BMIBI) plotted against average diel dissolved oxygen range (AVGRNGDO). Metric abbreviations are given in Appendix 15(a). Stressor-response breakpoint/threshold analysis results are displayed as vertical lines: Conditional Probability breakpoint (vertical, short dashed); Quantile Regression threshold (vertical, thick solid); Quantile Regression 90th percentile regression (sloping, thin solid) Regression Tree (RT) breakpoint (vertical, long dashed). A red line indicates the metric response was opposite of predicted (i.e. overall metric scores improved with decreasing AVGRNGDO levels).



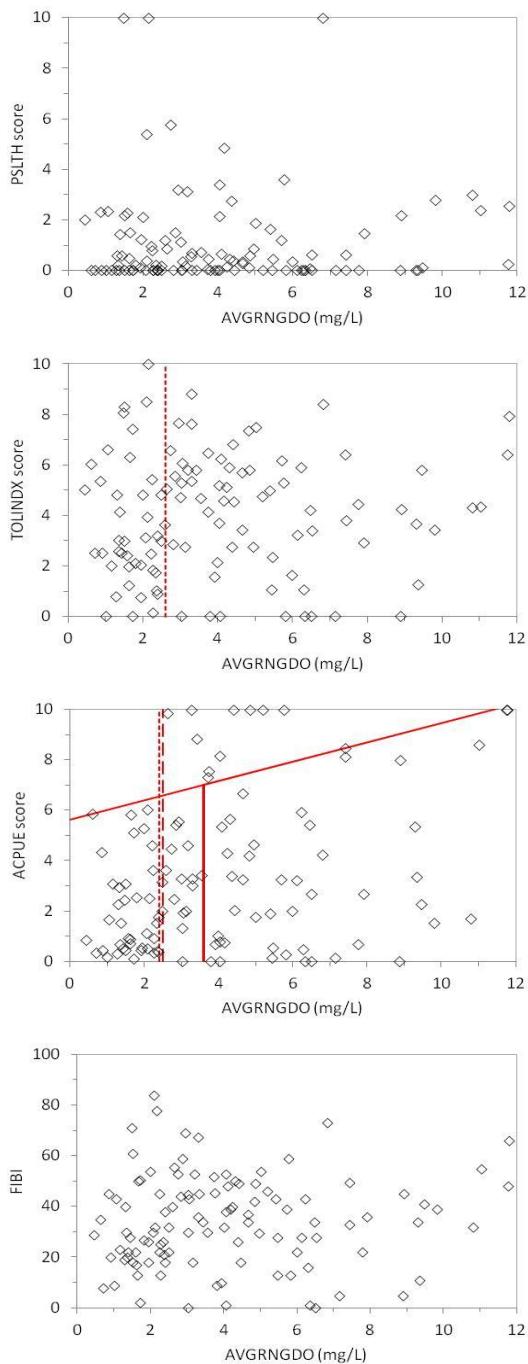
Appendix 15(k). Component metrics of the Fish Index of Biotic Integrity (FIBI) plotted against average diel dissolved oxygen minima (AVGMINDO). Metric abbreviations are given in Appendix 15(a). Stressor-response breakpoint/threshold analysis results are displayed as vertical lines: Conditional Probability breakpoint (vertical, short dashed); Quantile Regression threshold (vertical, thick solid); Quantile Regression 90th percentile regression (sloping, thin solid) Regression Tree (RT) breakpoint (vertical, long dashed). A red line indicates the metric response was opposite of predicted (i.e. overall metric scores improved with decreasing AVGMINDO levels).



Appendix 15(k) (continued). Component metrics of the Fish Index of Biotic Integrity (FIBI) plotted against average diel dissolved oxygen minima (AVGMINDO). Metric abbreviations are given in Appendix 15(a). Stressor-response breakpoint/threshold analysis results are displayed as vertical lines: Conditional Probability breakpoint (vertical, short dashed); Quantile Regression threshold (vertical, thick solid); Quantile Regression 90th percentile regression (sloping, thin solid) Regression Tree (RT) breakpoint (vertical, long dashed). A red line indicates the metric response was opposite of predicted (i.e. overall metric scores improved with decreasing AVGMINDO levels).



Appendix 15(I). Component metrics of the Fish Index of Biotic Integrity (FIBI) plotted against average diel DO range (AVGRNGDO). Metric abbreviations are given in Appendix 15(a). Stressor-response breakpoint/threshold analysis results are displayed as vertical lines: Conditional Probability breakpoint (vertical, short dashed); Quantile Regression threshold (vertical, thick solid); Quantile Regression 90th percentile regression (sloping, thin solid) Regression Tree (RT) breakpoint (vertical, long dashed). A red line indicates the metric response was opposite of predicted (i.e. overall metric scores improved with decreasing AVGRNGO levels).



Appendix 15(l) (continued). Component metrics of the Fish Index of Biotic Integrity (FIBI) plotted against average diel dissolved oxygen range (AVGRNGDO). Metric abbreviations are given in Appendix 15(a). Stressor-response breakpoint/threshold analysis results are displayed as vertical lines: Conditional Probability breakpoint (vertical, short dashed); Quantile Regression threshold (vertical, thick solid); Quantile Regression 90th percentile regression (sloping, thin solid) Regression Tree (RT) breakpoint (vertical, long dashed). A red line indicates the metric response was opposite of predicted (i.e. overall metric scores improved with decreasing AVGRNGO levels).



Appendix 16. Examples of rock substrate periphyton growth evaluated in a photograph-based exercise completed by aquatic biologists responsible for collecting stream benthic macroinvertebrate samples for the IDNR stream bioassessment program. Biologists evaluated periphyton colonization of rock substrates shown in (a) and (b) as heavy coverage (>75%) of filamentous growth with 100% concurrence. The substrates shown in (c) was evaluated as heavy nonfilamentous algal growth with 86% concurrence. Substrate (d) has significant silt coverage that obscures visual evaluation of periphyton coverage. Biologists were roughly evenly divided in characterizing the growth as either predominantly filamentous or nonfilamentous algal growth, Evaluations of periphyton coverage ranged from a majority rating of moderate (25-50%) to less than half of the evaluations consisting of either moderately heavy (51-75%) or heavy(>75%).

**Appendix 17(a). Stressor Identification (SI) monitoring (2001-2011) data summary for total ammonia-nitrogen.**

Site	Total Ammonia - Nitrogen (mg/L)							
	All Samples				July - October			
	N	Min.	Q25	Median	Q75	Max.	Mean	Std.Dev.
bmc1	36	<0.05	<0.05	<0.05	0.09	0.80	0.14	0.22
bmc3	34	<0.05	<0.05	<0.05	0.07	1.30	0.12	0.24
cmpc53	21	<0.05	<0.05	<0.05	0.10	1.90	0.24	0.54
dc1	14	<0.05	<0.05	<0.05	0.15	0.35	0.11	0.09
dc2	13	<0.05	<0.05	<0.05	0.08	0.19	0.08	0.05
drc1	59	<0.05	<0.05	<0.05	<0.05	0.10	0.05	0.01
drc4	60	<0.05	<0.05	<0.05	<0.05	0.12	0.05	0.01
hckrc158	42	<0.05	<0.05	<0.05	0.12	2.00	0.17	0.35
ldc1	43	<0.05	<0.05	<0.05	<0.05	2.40	0.14	0.37
ldc2	46	<0.05	<0.05	<0.05	<0.05	1.30	0.14	0.27
lfr14	3	<0.05	<0.05	0.21	0.32	0.32	0.19	0.14
lfr51	17	<0.05	<0.05	0.06	0.10	0.18	0.08	0.04
lyn1	45	<0.05	<0.05	<0.05	<0.05	0.55	0.08	0.10
lyn2	22	<0.05	<0.05	<0.05	0.07	0.65	0.11	0.16
mfsbvc45	21	<0.05	<0.05	0.07	0.15	3.10	0.33	0.75
mlfrdc49	13	<0.05	0.06	0.10	0.24	0.74	0.18	0.20
mrbc1	6	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.00
mrbc2	28	<0.05	<0.05	<0.05	<0.05	0.06	0.05	0.00
mrbc3	24	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.00
nfmqr28	21	<0.05	<0.05	0.08	0.12	1.80	0.25	0.46
nfmqr30	21	<0.05	0.06	0.10	0.25	3.60	0.38	0.80
slvrc2a	25	<0.05	0.06	0.18	0.55	3.60	0.48	0.77
wlntc1	11	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.00
wlntc2	11	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.00
wlntc200	11	<0.05	<0.05	<0.05	<0.05	0.11	0.06	0.02
wlntc3	11	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.00

**Appendix 17(b). Stressor Identification (SI) monitoring (2001-2011) data summary for nitrate+nitrite-nitrogen.**

Site	Nitrate + Nitrite - Nitrogen (mg/L)							
	All Samples				July - October			
	N	Min.	Q25	Median	Q75	Max.	Mean	Std.Dev.
bmc1	36	2.50	6.78	12.00	14.00	24.00	11.41	5.25
bmc3	34	2.40	7.68	12.50	15.00	26.00	12.04	5.52
cmpc53	21	<0.10	2.90	8.30	12.50	14.00	7.54	5.00
dc1	14	<0.10	<0.10	0.30	0.82	1.50	0.48	0.46
dc2	13	<0.10	0.32	0.50	0.80	1.20	0.57	0.32
drc1	59	1.00	2.40	4.40	5.80	13.00	4.62	2.63
drc4	60	1.20	3.00	4.50	6.55	12.00	4.93	2.40
hckrc158	42	0.35	8.88	16.00	25.00	40.00	17.30	10.52
ldc1	43	1.40	7.50	11.00	13.00	17.00	10.06	4.05
ldc2	46	3.10	9.73	14.00	16.00	18.00	12.44	4.09
lfr14	3	1.60	1.60	1.60	3.00	3.00	2.07	0.81
lfr51	17	2.00	4.10	6.50	13.00	18.00	8.24	5.04
lyn1	45	<0.10	6.70	12.00	17.00	27.00	12.04	7.07
lyn2	22	0.44	5.15	8.35	12.00	16.00	8.57	4.15
mfsbvc45	21	1.80	4.70	10.00	17.50	21.00	11.29	6.40
mlfrdc49	13	0.80	1.50	3.00	5.55	8.40	3.71	2.61
mrbc1	6	<0.10	<0.10	7.80	11.25	12.00	6.47	5.22
mrbc2	28	5.20	8.18	11.00	12.00	13.00	9.93	2.13
mrbc3	24	5.30	8.18	11.00	11.75	13.00	9.77	2.33
nfmqr28	21	2.90	3.80	4.90	6.80	16.00	6.06	3.65
nfmqr30	21	1.60	2.15	3.70	6.65	16.00	5.22	4.06
slvrc2a	25	0.82	2.25	6.50	12.50	18.00	7.86	5.60
wlntc1	11	3.60	4.70	6.00	6.40	6.60	5.57	1.02
wlntc2	11	5.00	6.00	7.10	7.70	8.10	6.82	1.00
wlntc200	11	4.40	5.00	6.70	7.10	7.30	6.17	1.04
wlntc3	11	5.10	6.20	7.40	8.00	8.40	7.11	1.07

**Appendix 17(c). Stressor Identification (SI) monitoring (2001-2011) data summary for dissolved inorganic nitrogen.**

Site	Dissolved Inorganic Nitrogen (mg/L)															
	All Samples				July - October											
N	Min.	Q25	Median	Q75	Max.	Mean	Std.Dev.	N	Min.	Q25	Median	Q75	Max.	Mean	Std.Dev.	
bmc1	36	2.56	6.90	12.05	14.14	24.05	11.55	5.21	9	5.78	6.58	11.05	12.55	15.10	10.19	3.28
bmc3	34	2.46	7.83	12.55	15.12	26.05	12.17	5.52	9	5.33	8.91	12.05	13.05	15.05	11.05	3.01
cmpc53	21	<0.15	2.95	8.45	12.57	14.10	7.78	4.99	11	<0.15	0.45	4.15	12.10	14.05	5.98	5.43
dc1	14	<0.15	<0.15	0.44	0.99	1.74	0.59	0.50	10	<0.15	<0.15	0.22	0.92	1.74	0.53	0.56
dc2	13	<0.15	0.38	0.55	0.86	1.38	0.65	0.36	9	<0.15	0.28	0.55	0.62	0.99	0.50	0.25
drc1	59	1.05	2.45	4.45	5.85	13.05	4.67	2.63	25	1.05	1.85	2.45	4.20	7.65	3.00	1.61
drc4	60	1.30	3.05	4.55	6.60	12.05	4.99	2.40	25	1.30	2.60	3.05	4.10	7.85	3.44	1.45
hckrc158	42	0.40	8.92	16.08	25.05	40.30	17.47	10.56	14	0.40	3.50	8.62	19.55	33.64	11.95	10.67
ldc1	43	1.45	7.69	11.36	13.05	17.05	10.20	3.96	19	1.45	3.55	9.05	13.05	17.05	8.83	4.83
ldc2	46	3.15	9.82	14.05	16.05	18.05	12.57	4.02	22	3.15	7.57	13.05	15.30	18.05	11.62	4.73
lfr14	3	1.81	1.81	1.92	3.05	3.05	2.26	0.69	3	1.81	1.81	1.92	3.05	3.05	2.26	0.69
lfr51	17	2.05	4.15	6.60	13.05	18.10	8.32	5.05	8	2.05	2.66	4.65	9.21	10.10	5.73	3.25
lyn1	45	<0.15	6.77	12.05	17.05	27.05	12.11	7.05	17	<0.15	1.20	6.85	14.05	19.05	7.41	6.43
lyn2	22	0.49	5.59	8.42	12.05	16.05	8.68	4.12	9	0.49	2.90	4.58	8.30	11.05	5.35	3.41
mfsbvc45	21	1.85	5.65	11.30	17.56	21.10	11.62	6.29	10	1.85	3.15	5.65	11.86	18.10	7.86	5.81
mlfrdc49	13	0.90	1.64	3.05	5.63	8.80	3.89	2.64	7	0.90	1.77	2.46	5.15	8.38	3.63	2.56
mrbc1	6	<0.15	<0.15	7.85	11.30	12.05	6.52	5.22	6	<0.15	<0.15	7.85	11.30	12.05	6.52	5.22
mrbc2	28	2.55	8.23	11.05	12.05	13.05	9.98	2.13	13	5.25	7.36	8.45	11.55	12.05	8.91	2.37
mrbc3	24	5.35	8.23	11.05	11.80	13.05	9.82	2.33	9	5.35	5.75	6.85	10.05	12.05	7.89	2.39
nfmqr28	21	2.98	3.90	5.10	6.98	16.20	6.32	3.68	13	2.98	3.62	3.95	5.35	7.50	4.50	1.31
nfmqr30	21	1.71	2.34	4.30	7.30	16.20	5.60	4.09	13	1.71	2.12	2.59	4.83	7.00	3.41	1.67
slvrc2a	25	0.92	3.33	7.42	12.82	18.06	8.34	5.37	12	0.92	1.86	3.33	6.14	18.06	5.51	5.65
wlntc1	11	3.65	4.75	6.05	6.45	6.65	5.62	1.02	8	3.65	4.45	5.45	6.23	6.65	5.34	1.05
wlntc2	11	5.05	6.05	7.15	7.75	8.15	6.87	1.00	8	5.05	5.83	6.40	7.75	8.15	6.66	1.11
wlntc200	11	4.45	5.05	6.81	7.15	7.35	6.23	1.04	8	4.45	4.98	5.90	7.08	7.35	5.95	1.10
wlntc3	11	5.15	6.25	7.45	8.05	8.45	7.16	1.07	8	5.15	5.95	6.80	8.03	8.45	6.91	1.16

**Appendix 17(d). Stressor Identification (SI) monitoring (2001-2011) data summary for total Kjeldahl nitrogen.**

Site	Total Kjeldahl Nitrogen (mg/L)															
	All Samples				July - October											
N	Min.	Q25	Median	Q75	Max.	Mean	Std.Dev.	N	Min.	Q25	Median	Q75	Max.	Mean	Std.Dev.	
bmc1	36	<0.10	0.33	0.40	0.78	2.70	0.70	0.65	9	0.30	0.35	0.40	1.25	2.70	0.84	0.82
bmc3	34	<0.10	0.30	0.40	0.65	5.20	0.70	0.90	9	0.30	0.40	0.50	0.70	1.00	0.56	0.22
cmpc53	21	0.50	0.68	0.80	1.08	3.90	1.16	0.90	11	0.51	0.68	0.80	0.92	2.50	0.94	0.55
dc1	14	0.30	0.58	0.70	0.90	2.20	0.87	0.57	10	0.60	0.70	0.70	1.40	2.20	1.03	0.59
dc2	13	0.30	0.50	0.60	0.80	1.50	0.72	0.30	9	0.50	0.55	0.80	0.90	1.50	0.79	0.31
drc1	59	<0.10	<0.10	0.30	0.49	2.20	0.36	0.33	25	<0.10	<0.10	0.20	0.52	0.90	0.31	0.27
drc4	60	<0.10	<0.10	0.20	0.32	2.00	0.30	0.30	25	<0.10	<0.10	0.20	0.28	1.10	0.25	0.24
hckrc158	42	0.20	0.80	1.10	1.70	6.10	1.59	1.32	14	0.60	0.68	1.30	2.40	4.90	1.74	1.37
ldc1	43	0.30	0.50	0.70	1.00	5.00	0.91	0.80	19	0.30	0.50	0.60	1.00	1.30	0.71	0.29
ldc2	46	<0.10	0.50	0.70	1.23	3.30	0.95	0.70	22	<0.10	0.58	0.70	0.93	1.70	0.78	0.39
lfr14	3	1.00	1.00	1.60	11.00	11.00	4.53	5.61	3	1.00	1.00	1.60	11.00	11.00	4.53	5.61
lfr51	17	<0.10	0.30	0.69	0.89	3.00	0.74	0.67	8	<0.10	0.62	0.79	0.90	3.00	0.97	0.86
lyn1	45	<0.10	0.40	0.50	0.85	8.90	0.84	1.30	17	0.30	0.50	0.60	0.70	1.70	0.64	0.31
lyn2	22	0.20	0.40	0.60	1.13	3.50	0.95	0.83	9	0.60	0.60	0.70	0.95	1.70	0.83	0.36
mfsbvc45	21	<0.10	0.58	0.87	1.55	4.60	1.21	1.05	10	0.40	0.60	0.90	1.80	2.60	1.14	0.70
mlfrdc49	13	0.30	1.05	1.30	1.65	2.10	1.31	0.49	7	1.30	1.30	1.60	1.90	2.10	1.60	0.32
mrbc1	6	0.40	0.50	0.59	1.03	1.10	0.70	0.28	6	0.40	0.50	0.59	1.03	1.10	0.70	0.28
mrbc2	27	<0.10	0.20	0.30	0.40	1.00	0.37	0.21	12	<0.10	0.20	0.30	0.48	0.80	0.36	0.20
mrbc3	23	<0.10	0.20	0.30	0.50	0.80	0.33	0.18	8	0.20	0.35	0.50	0.60	0.80	0.50	0.19
nfmqr28	21	0.30	0.52	0.83	1.15	4.90	1.19	1.20	13	0.30	0.52	0.78	1.04	4.00	0.99	0.94
nfmqr30	21	0.20	0.70	0.88	1.50	5.60	1.48	1.40	13	0.40	0.64	0.79	1.40	5.60	1.24	1.36
slvrc2a	25	0.40	0.85	1.10	2.30	8.80	1.88	2.09	12	0.60	0.83	1.30	2.73	8.80	2.53	2.85
wlntc1	11	<0.10	0.20	0.30	0.40	0.60	0.34	0.14	8	<0.10	0.23	0.40	0.48	0.60	0.36	0.16
wlntc2	11	<0.10	0.20	0.20	0.40	0.50	0.27	0.13	8	<0.10	0.20	0.35	0.40	0.50	0.31	0.14
wlntc200	11	<0.10	0.20	0.20	0.40	0.50	0.28	0.13	8	0.20	0.20	0.25	0.40	0.50	0.30	0.12
wlntc3	11	<0.10	<0.10	0.20	0.30	0.40	0.23	0.10	8	<0.10	0.20	0.30	0.30	0.40	0.26	0.09

**Appendix 17(e). Stressor Identification (SI) monitoring (2001-2011) data summary for total nitrogen.**

Site	Total Nitrogen (mg/L)															
	All Samples				July - October											
N	Min.	Q25	Median	Q75	Max.	Mean	Std.Dev.	N	Min.	Q25	Median	Q75	Max.	Mean	Std.Dev.	
bmc1	36	2.90	7.80	12.40	15.33	24.30	12.11	5.13	9	6.70	7.85	11.80	12.85	15.40	10.82	2.94
bmc3	34	2.80	8.28	13.40	15.83	26.30	12.74	5.57	9	6.00	9.35	12.30	13.75	15.30	11.53	2.95
cmpc53	21	0.78	3.64	9.50	13.29	16.00	8.71	4.95	11	0.78	1.94	4.96	12.80	14.75	6.86	5.28
dc1	14	0.68	0.80	1.01	1.63	3.70	1.35	0.84	10	0.70	0.80	0.91	2.15	3.70	1.45	0.98
dc2	13	0.73	0.95	1.22	1.62	2.11	1.29	0.41	9	0.73	0.95	1.10	1.52	2.11	1.23	0.44
drc1	59	1.82	2.70	4.80	6.30	13.60	4.98	2.70	25	1.82	1.95	2.70	4.70	8.10	3.26	1.67
drc4	60	2.30	3.13	4.75	6.83	12.50	5.23	2.45	25	2.30	2.70	3.10	4.40	8.00	3.63	1.45
hkrc158	42	3.90	10.25	17.40	25.95	41.40	18.90	10.13	14	3.90	5.51	9.70	20.38	34.70	13.58	10.21
ldc1	43	2.40	8.50	12.40	14.10	17.70	10.97	3.94	19	2.40	4.40	10.00	14.00	17.70	9.49	4.80
ldc2	46	4.00	10.20	14.45	16.50	18.60	13.38	3.85	22	4.00	8.78	13.75	16.28	18.60	12.35	4.63
lfr14	3	3.20	3.20	4.00	12.60	12.60	6.60	5.21	3	3.20	3.20	4.00	12.60	12.60	6.60	5.21
lfr51	17	2.69	4.84	7.10	13.66	18.10	8.98	4.95	8	2.69	3.27	5.50	10.05	11.80	6.62	3.51
lyn1	45	0.70	7.50	13.20	17.75	27.30	12.88	6.93	17	0.70	1.90	7.10	14.65	19.50	8.01	6.35
lyn2	22	2.14	6.68	10.15	12.43	16.40	9.51	3.95	9	2.14	3.55	5.40	8.90	11.60	6.12	3.18
mfsbvc45	21	3.60	6.82	11.87	18.04	21.10	12.49	5.88	10	3.60	4.87	6.82	12.71	18.40	8.93	5.33
mlfrdc49	13	1.70	2.75	4.60	6.80	10.00	5.02	2.73	7	2.10	3.40	3.70	6.40	10.00	5.03	2.65
mrbc1	6	1.10	1.17	8.35	11.70	12.60	7.17	4.96	6	1.10	1.17	8.35	11.70	12.60	7.17	4.96
mrbc2	28	5.70	8.40	11.10	12.20	13.30	10.28	2.14	13	5.70	7.40	8.70	11.75	12.60	9.19	2.39
mrbc3	24	5.80	8.63	11.10	11.90	13.20	10.09	2.25	9	5.80	6.00	7.60	10.45	12.50	8.29	2.41
nfmqr28	21	3.93	4.42	6.20	8.05	17.70	7.25	3.89	13	3.93	4.25	4.57	6.51	8.00	5.29	1.44
nfmqr30	21	2.48	3.29	5.60	9.15	17.50	6.70	4.38	13	2.48	2.94	3.50	5.74	7.60	4.29	1.81
slvrc2a	25	1.62	5.10	9.40	13.70	18.90	9.74	5.14	12	1.62	2.82	5.35	10.15	18.90	7.38	5.73
wlntc1	11	4.20	5.10	6.20	6.70	7.10	5.91	0.96	8	4.20	4.80	5.60	6.53	7.10	5.65	0.99
wlntc2	11	5.50	6.30	7.30	7.90	8.40	7.09	0.95	8	5.50	6.15	6.55	8.05	8.40	6.93	1.07
wlntc200	11	4.80	5.40	6.90	7.40	7.60	6.46	1.01	8	4.80	5.25	6.05	7.38	7.60	6.20	1.08
wlntc3	11	5.50	6.50	7.50	8.20	8.60	7.34	1.03	8	5.50	6.13	6.95	8.28	8.60	7.13	1.14

**Appendix 17(f). Stressor Identification (SI) monitoring (2001-2011) data summary for ratio of dissolved inorganic nitrogen to total nitrogen.**

Site	Dissolved Inorganic Nitrogen : Total Nitrogen (Ratio)															
	All Samples				July - October											
N	Min.	Q25	Median	Q75	Max.	Mean	Std.Dev.	N	Min.	Q25	Median	Q75	Max.	Mean	Std.Dev.	
bmc1	36	0.76	0.90	0.96	0.98	1.00	0.94	0.05	9	0.76	0.90	0.96	0.98	0.98	0.93	0.07
bmc3	34	0.80	0.92	0.96	0.98	1.00	0.95	0.05	9	0.89	0.94	0.96	0.97	0.98	0.95	0.03
cmpc53	21	0.15	0.75	0.89	0.95	0.96	0.78	0.27	11	0.15	0.19	0.88	0.95	0.95	0.68	0.35
dc1	14	0.17	0.20	0.35	0.58	0.89	0.41	0.24	10	0.17	0.19	0.21	0.49	0.56	0.30	0.16
dc2	13	0.17	0.36	0.49	0.64	0.79	0.49	0.19	9	0.17	0.27	0.42	0.53	0.57	0.40	0.14
drc1	59	0.55	0.93	0.96	0.98	0.99	0.93	0.08	25	0.55	0.89	0.96	0.98	0.99	0.91	0.11
drc4	60	0.57	0.95	0.97	0.98	0.99	0.95	0.07	25	0.57	0.94	0.98	0.98	0.99	0.94	0.09
hkrc158	42	0.08	0.89	0.94	0.97	1.00	0.88	0.18	14	0.08	0.72	0.90	0.96	0.97	0.79	0.26
ldc1	43	0.56	0.90	0.94	0.96	0.98	0.91	0.09	19	0.56	0.89	0.94	0.96	0.98	0.90	0.11
ldc2	46	0.73	0.91	0.95	0.97	1.00	0.93	0.06	22	0.73	0.90	0.94	0.97	1.00	0.92	0.07
lfr14	3	0.14	0.14	0.60	0.76	0.76	0.50	0.32	3	0.14	0.14	0.60	0.76	0.76	0.50	0.32
lfr51	17	0.76	0.83	0.93	0.97	1.00	0.90	0.08	8	0.76	0.77	0.83	0.92	1.00	0.85	0.08
lyn1	45	0.21	0.88	0.96	0.98	1.00	0.88	0.20	17	0.21	0.65	0.94	0.96	0.98	0.78	0.27
lyn2	22	0.23	0.81	0.93	0.97	0.99	0.87	0.16	9	0.23	0.79	0.85	0.93	0.95	0.80	0.22
mfsbvc45	21	0.50	0.86	0.94	0.97	1.00	0.88	0.14	10	0.50	0.68	0.88	0.95	0.98	0.81	0.18
mlfrdc49	13	0.43	0.62	0.75	0.86	0.92	0.73	0.15	7	0.43	0.52	0.66	0.80	0.84	0.66	0.15
mrbc1	6	0.13	0.13	0.94	0.96	0.97	0.68	0.42	6	0.13	0.13	0.94	0.96	0.97	0.68	0.42
mrbc2	28	0.88	0.96	0.97	0.98	1.01	0.97	0.03	13	0.88	0.96	0.97	0.98	1.01	0.97	0.03
mrbc3	24	0.90	0.95	0.98	0.99	1.01	0.97	0.03	9	0.90	0.92	0.95	0.98	1.01	0.95	0.04
nfmqr28	21	0.72	0.81	0.87	0.92	0.99	0.86	0.08	13	0.72	0.81	0.84	0.92	0.94	0.85	0.07
nfmqr30	21	0.59	0.75	0.81	0.90	0.99	0.81	0.10	13	0.59	0.72	0.76	0.87	0.92	0.78	0.10
slvrc2a	25	0.34	0.69	0.86	0.94	0.98	0.80	0.17	12	0.34	0.53	0.69	0.83	0.96	0.69	0.19
wlntc1	11	0.87	0.93	0.95	0.98	0.99	0.95	0.03	8	0.87	0.93	0.94	0.97	0.99	0.94	0.04
wlntc2	11	0.92	0.95	0.98	0.98	0.99	0.97	0.02	8	0.92	0.94	0.96	0.98	0.99	0.96	0.02
wlntc200	11	0.92	0.95	0.97	0.98	0.99	0.96	0.02	8	0.92	0.93	0.97	0.98	0.98	0.96	0.02
wlntc3	11	0.94	0.96	0.98	0.99	0.99	0.97	0.02	8	0.94	0.96	0.97	0.98	0.99	0.97	0.02

**Appendix 17(g). Stressor Identification (SI) monitoring (2001-2011) data summary for dissolved orthophosphate phosphorus.**

Site	Dissolved Orthophosphate - Phosphorus (mg/L)															
	All Samples				July - October											
N	Min.	Q25	Median	Q75	Max.	Mean	Std.Dev.	N	Min.	Q25	Median	Q75	Max.	Mean	Std.Dev.	
bmc1	36	<0.02	0.06	0.11	0.20	1.10	0.20	0.26	9	0.08	0.10	0.17	0.39	1.10	0.29	0.34
bmc3	34	0.04	0.05	0.07	0.18	1.90	0.18	0.34	9	0.04	0.07	0.07	0.19	0.24	0.11	0.07
cmpc53	21	0.04	0.08	0.09	0.13	0.40	0.12	0.09	11	0.04	0.06	0.09	0.12	0.13	0.08	0.03
dc1	14	<0.02	<0.02	0.02	0.05	0.12	0.04	0.03	10	<0.02	<0.02	0.04	0.07	0.12	0.05	0.04
dc2	13	<0.02	0.02	0.03	0.05	0.09	0.04	0.02	9	0.03	0.03	0.04	0.05	0.09	0.05	0.02
drc1	38	<0.02	<0.02	0.03	0.04	0.20	0.04	0.04	11	<0.02	<0.02	0.03	0.07	0.13	0.05	0.04
drc4	38	<0.02	0.02	0.03	0.04	0.13	0.04	0.03	11	<0.02	0.03	0.03	0.05	0.10	0.04	0.03
hckrc158	42	0.17	1.28	2.75	4.18	8.90	3.14	2.28	14	0.17	0.71	1.75	2.90	8.90	2.41	2.48
ldc1	43	0.02	0.04	0.07	0.18	1.40	0.15	0.24	19	0.02	0.02	0.04	0.13	0.34	0.08	0.08
ldc2	46	0.03	0.06	0.10	0.27	0.94	0.20	0.20	22	0.03	0.07	0.11	0.21	0.57	0.16	0.13
lfr14	3	0.12	0.12	0.14	0.26	0.26	0.17	0.08	3	0.12	0.12	0.14	0.26	0.26	0.17	0.08
lfr51	17	0.02	0.05	0.06	0.19	0.53	0.14	0.16	8	0.02	0.04	0.07	0.32	0.44	0.15	0.16
lyn1	45	0.04	0.06	0.09	0.14	0.63	0.12	0.12	17	0.04	0.06	0.10	0.14	0.19	0.10	0.05
lyn2	22	<0.02	0.04	0.07	0.11	0.74	0.12	0.17	9	0.03	0.05	0.08	0.10	0.11	0.07	0.03
mfsbvc45	21	<0.02	0.03	0.07	0.10	0.50	0.09	0.10	10	<0.02	0.03	0.06	0.10	0.12	0.06	0.04
mlfrdc49	13	0.10	0.28	1.30	1.95	3.10	1.22	0.95	7	0.22	0.72	1.80	2.20	3.10	1.65	0.96
mrbc1	6	<0.05	0.05	0.06	0.07	0.11	0.06	0.02	6	<0.05	0.05	0.06	0.07	0.11	0.06	0.02
mrbc2	28	0.02	0.05	0.05	0.08	0.16	0.06	0.03	13	0.04	0.05	0.06	0.10	0.12	0.07	0.03
mrbc3	24	<0.02	0.03	0.04	0.06	0.14	0.05	0.03	9	0.02	0.04	0.04	0.07	0.09	0.05	0.02
nfmqr28	21	0.06	0.10	0.12	0.16	0.89	0.17	0.18	13	0.06	0.09	0.13	0.15	0.89	0.18	0.22
nfmqr30	21	<0.05	0.09	0.13	0.16	1.20	0.20	0.26	13	<0.05	0.07	0.13	0.15	1.20	0.19	0.30
slvrc2a	25	0.10	0.22	0.37	0.52	2.40	0.48	0.49	12	0.18	0.25	0.41	0.65	2.40	0.65	0.66
wlntc1	11	<0.02	0.02	0.05	0.06	0.08	0.05	0.02	8	0.02	0.04	0.06	0.07	0.08	0.05	0.02
wlntc2	11	0.02	0.04	0.05	0.06	0.08	0.05	0.02	8	0.03	0.04	0.06	0.06	0.08	0.05	0.02
wlntc200	11	0.02	0.03	0.05	0.06	0.09	0.05	0.02	8	0.02	0.03	0.05	0.06	0.07	0.05	0.02
wlntc3	11	0.02	0.03	0.05	0.06	0.08	0.05	0.02	8	0.03	0.04	0.06	0.07	0.08	0.06	0.02

**Appendix 17(h). Stressor Identification (SI) monitoring (2001-2011) data summary for total phosphorus.**

Site	Total Phosphorus (mg/L)															
	All Samples				July - October											
N	Min.	Q25	Median	Q75	Max.	Mean	Std.Dev.	N	Min.	Q25	Median	Q75	Max.	Mean	Std.Dev.	
bmc1	36	0.07	0.10	0.22	0.34	1.30	0.30	0.31	9	0.08	0.13	0.23	0.60	1.30	0.40	0.42
bmc3	34	0.04	0.08	0.20	0.31	2.50	0.29	0.43	9	0.09	0.11	0.20	0.31	0.42	0.21	0.12
cmpc53	21	0.10	0.19	0.22	0.30	0.79	0.26	0.15	11	0.10	0.11	0.20	0.25	0.32	0.19	0.07
dc1	14	0.05	0.07	0.08	0.16	0.31	0.12	0.08	10	0.05	0.08	0.11	0.19	0.31	0.14	0.08
dc2	13	0.04	0.07	0.10	0.11	0.18	0.10	0.04	9	0.07	0.10	0.10	0.14	0.18	0.11	0.04
drc1	59	<0.02	0.03	0.04	0.09	0.65	0.07	0.09	25	<0.02	0.03	0.04	0.12	0.28	0.08	0.07
drc4	60	<0.02	0.04	0.05	0.06	0.56	0.07	0.08	25	0.03	0.04	0.05	0.07	0.31	0.07	0.07
hckrc158	42	0.36	1.83	2.80	4.43	7.30	3.13	1.84	14	0.36	1.12	1.95	3.00	6.70	2.30	1.67
ldc1	43	0.03	0.08	0.13	0.28	1.60	0.24	0.30	19	0.03	0.07	0.09	0.16	0.52	0.14	0.12
ldc2	46	0.03	0.08	0.13	0.39	1.10	0.26	0.25	22	0.03	0.10	0.13	0.27	0.62	0.21	0.17
lfr14	3	0.23	0.23	0.28	0.31	0.31	0.27	0.04	3	0.23	0.23	0.28	0.31	0.31	0.27	0.04
lfr51	17	0.07	0.10	0.16	0.36	1.20	0.29	0.31	8	0.10	0.11	0.19	0.36	0.84	0.28	0.25
lyn1	45	0.04	0.07	0.12	0.23	1.60	0.20	0.26	17	0.04	0.08	0.13	0.20	0.26	0.14	0.07
lyn2	22	0.04	0.08	0.11	0.25	1.00	0.22	0.27	9	0.07	0.08	0.11	0.17	0.26	0.13	0.06
mfsbvc45	21	0.08	0.10	0.12	0.24	0.60	0.17	0.12	10	0.08	0.10	0.11	0.23	0.30	0.15	0.08
mlfrdc49	13	0.10	0.36	1.10	2.05	3.00	1.25	0.95	7	0.30	0.41	2.00	2.20	3.00	1.66	0.98
mrbc1	6	<0.05	0.07	0.15	0.21	0.37	0.16	0.11	6	<0.05	0.07	0.15	0.21	0.37	0.16	0.11
mrbc2	27	0.03	0.05	0.08	0.09	0.21	0.08	0.04	13	0.05	0.06	0.09	0.12	0.17	0.09	0.03
mrbc3	24	0.04	0.04	0.05	0.09	0.17	0.07	0.04	9	0.05	0.05	0.07	0.11	0.17	0.08	0.04
nfmqr28	21	0.10	0.16	0.20	0.26	1.10	0.30	0.26	13	0.10	0.13	0.19	0.24	0.68	0.22	0.15
nfmqr30	21	<0.10	0.17	0.25	0.31	1.10	0.35	0.29	13	<0.10	0.16	0.24	0.29	1.10	0.28	0.26
slvrc2a	25	0.15	0.35	0.45	0.73	4.70	0.76	0.94	12	0.23	0.36	0.54	1.42	4.70	1.06	1.29
wlntc1	11	0.05	0.06	0.09	0.12	0.23	0.10	0.05	8	0.05	0.06	0.10	0.13	0.23	0.11	0.06
wlntc2	11	0.05	0.06	0.08	0.09	0.10	0.08	0.02	8	0.05	0.06	0.08	0.10	0.10	0.08	0.02
wlntc200	11	0.05	0.06	0.09	0.11	0.16	0.09	0.03	8	0.06	0.06	0.08	0.11	0.12	0.08	0.03
wlntc3	11	0.05	0.06	0.07	0.08	0.10	0.07	0.02	8	0.05	0.06	0.07	0.10	0.10	0.08	0.02

**Appendix 17(i). Stressor Identification (SI) monitoring (2001-2011) data summary for ratio of dissolved orthophosphate to total phosphorus.**

Site	Dissolved Orthophosphate : Total Phosphorus (Ratio)															
	All Samples				July - October											
N	Min.	Q25	Median	Q75	Max.	Mean	Std.Dev.	N	Min.	Q25	Median	Q75	Max.	Mean	Std.Dev.	
bmc1	36	0.17	0.47	0.62	0.76	1.38	0.63	0.23	9	0.48	0.59	0.69	0.87	1.38	0.76	0.27
bmc3	34	0.29	0.44	0.60	0.74	1.00	0.60	0.20	9	0.30	0.43	0.53	0.71	0.83	0.56	0.17
cmpc53	21	0.24	0.31	0.41	0.57	1.30	0.50	0.29	11	0.24	0.37	0.41	0.55	1.30	0.50	0.29
dc1	14	0.18	0.25	0.33	0.40	0.50	0.34	0.09	10	0.18	0.28	0.38	0.41	0.50	0.35	0.10
dc2	13	0.25	0.29	0.33	0.50	0.57	0.39	0.12	9	0.28	0.30	0.33	0.53	0.57	0.41	0.12
drc1	38	0.25	0.50	0.60	0.75	1.50	0.63	0.25	11	0.25	0.33	0.58	0.69	1.00	0.57	0.22
drc4	38	0.16	0.49	0.63	0.75	1.33	0.60	0.24	11	0.16	0.33	0.67	0.75	1.00	0.58	0.27
hckrc158	42	0.22	0.89	0.96	1.03	1.29	0.97	0.48	14	0.29	0.71	0.91	1.01	1.29	1.02	0.81
ldc1	43	0.13	0.48	0.57	0.67	1.00	0.58	0.20	19	0.13	0.38	0.56	0.67	0.87	0.52	0.19
ldc2	46	0.48	0.68	0.80	0.86	1.13	0.78	0.14	22	0.50	0.68	0.78	0.87	1.13	0.78	0.17
lfr14	3	0.43	0.43	0.61	0.84	0.84	0.63	0.21	3	0.43	0.43	0.61	0.84	0.84	0.63	0.21
lfr51	17	0.03	0.50	0.52	0.74	1.20	0.58	0.31	8	0.13	0.23	0.51	0.71	0.90	0.50	0.27
lyn1	45	0.09	0.67	0.78	0.88	2.50	0.81	0.42	17	0.27	0.68	0.78	0.90	1.14	0.76	0.21
lyn2	22	0.17	0.44	0.56	0.76	0.85	0.58	0.18	9	0.42	0.46	0.58	0.74	0.80	0.59	0.14
mfsbvc45	21	0.09	0.30	0.47	0.72	1.20	0.51	0.28	10	0.09	0.25	0.43	0.77	1.20	0.51	0.35
mlfrdc49	13	0.50	0.80	0.94	1.11	1.76	0.98	0.32	7	0.73	0.90	0.94	1.05	1.76	1.05	0.33
mrbc1	6	0.16	0.28	0.49	0.82	1.20	0.56	0.37	6	0.16	0.28	0.49	0.82	1.20	0.56	0.37
mrbc2	27	0.50	0.63	0.76	0.91	1.33	0.78	0.20	13	0.54	0.64	0.83	0.95	1.33	0.82	0.22
mrbc3	24	0.22	0.53	0.80	0.96	1.00	0.75	0.22	9	0.22	0.46	0.75	0.80	0.86	0.64	0.22
nfmqr28	21	0.09	0.52	0.64	0.80	1.31	0.69	0.32	13	0.40	0.52	0.64	0.98	1.31	0.75	0.31
nfmqr30	21	0.11	0.39	0.53	0.67	1.40	0.55	0.28	13	0.28	0.39	0.53	0.68	1.40	0.61	0.32
slvrc2a	25	0.11	0.66	0.75	0.80	0.94	0.72	0.18	12	0.39	0.64	0.75	0.78	0.82	0.69	0.13
wlntc1	11	0.25	0.33	0.45	0.67	0.71	0.48	0.16	8	0.30	0.41	0.50	0.67	0.71	0.53	0.15
wlntc2	11	0.40	0.50	0.67	0.80	0.83	0.64	0.16	8	0.43	0.53	0.71	0.80	0.83	0.67	0.15
wlntc200	11	0.33	0.50	0.56	0.67	0.70	0.54	0.11	8	0.33	0.50	0.55	0.67	0.70	0.56	0.12
wlntc3	11	0.40	0.57	0.67	0.83	0.86	0.67	0.15	8	0.57	0.61	0.75	0.85	0.86	0.73	0.12

**Appendix 17(j). Stressor Identification (SI) monitoring (2001-2011) data summary for ratio of total nitrogen to total phosphorus.**

Site	Total Nitrogen : Total Phosphorus (Ratio)															
	All Samples				July - October											
N	Min.	Q25	Median	Q75	Max.	Mean	Std.Dev.	N	Min.	Q25	Median	Q75	Max.	Mean	Std.Dev.	
bmc1	36.0	5.2	21.4	52.6	152.5	347.1	88.2	81.4	9	5.2	17.3	42.6	98.8	153.8	61.1	49.5
bmc3	34.0	5.8	25.8	56.3	193.9	375.7	110.9	102.5	9	14.3	35.2	57.5	128.4	170.0	80.6	54.4
cmpc53	21.0	5.4	13.8	36.0	58.7	95.0	39.2	26.8	11	5.4	8.8	38.2	73.8	95.0	41.0	33.5
dc1	14.0	5.8	8.6	10.2	15.6	27.8	12.4	5.7	10	5.8	8.5	9.3	12.7	18.4	10.6	3.7
dc2	13.0	6.1	9.8	12.7	17.0	45.0	15.4	10.1	9	6.1	9.0	11.1	13.1	15.7	11.0	2.9
drc1	59.0	6.8	47.5	90.0	150.0	610.0	117.5	106.4	25	6.8	39.0	62.8	67.1	240.0	63.9	48.8
drc4	60.0	7.4	55.3	95.0	143.0	435.0	111.9	80.5	25	7.4	43.3	64.4	90.0	155.0	67.9	34.7
hckrc158	42.0	1.9	4.9	6.0	7.7	19.2	7.1	3.6	14	1.9	3.4	5.7	11.3	16.3	7.4	4.6
ldc1	43.0	5.7	36.6	75.2	141.1	386.7	95.0	76.6	19	18.6	50.0	67.7	110.0	386.7	96.5	86.1
ldc2	46.0	8.0	34.5	84.9	174.5	413.3	114.9	95.3	22	8.2	35.6	78.3	143.8	413.3	101.6	89.6
lfr14	3.0	10.3	10.3	17.4	45.0	45.0	24.2	18.3	3	10.3	10.3	17.4	45.0	45.0	24.2	18.3
lfr51	17.0	9.2	16.1	29.2	86.2	181.0	59.3	56.1	8	14.0	15.1	25.8	41.0	101.0	34.1	28.9
lyn1	45.0	4.3	29.2	98.0	254.1	412.5	140.0	123.3	17	4.3	8.7	69.1	131.3	385.0	93.5	106.6
lyn2	22.0	8.2	24.8	77.3	140.0	360.0	99.6	92.6	9	8.2	27.2	42.5	107.9	145.0	62.4	48.0
mfsbvc45	21.0	13.3	34.2	81.5	160.2	211.0	98.1	66.5	10	13.3	22.7	68.0	119.8	184.0	76.9	56.8
mlfrdc49	13.0	1.2	2.7	4.8	9.4	18.0	6.8	5.0	7	1.2	1.7	3.1	7.0	14.4	4.9	4.6
mrbc1	6.0	2.7	5.8	67.3	151.2	177.4	77.4	71.1	6	2.7	5.8	67.3	151.2	177.4	77.4	71.1
mrbc2	27.0	39.5	90.0	147.8	185.0	370.0	153.6	79.6	13	46.2	74.8	104.2	156.8	174.0	112.8	43.2
mrbc3	24.0	36.5	107.1	206.3	271.5	305.0	185.6	84.3	9	36.5	81.1	116.0	165.9	212.0	119.8	57.2
nfmqr28	21.0	11.1	18.7	25.6	48.7	80.0	33.7	20.9	13	11.5	18.7	24.1	47.3	80.0	32.3	20.6
nfmqr30	21.0	6.9	11.6	16.3	37.3	58.3	25.1	16.5	13	6.9	10.6	14.2	35.6	56.0	21.4	15.0
slvrc2a	25.0	2.2	6.0	17.4	39.1	52.5	22.4	16.9	12	2.2	4.5	6.0	14.2	52.5	14.1	18.1
wlntc1	11.0	28.7	39.2	65.6	90.0	111.7	69.0	27.4	8	28.7	38.4	60.1	89.6	102.0	63.3	27.6
wlntc2	11.0	64.0	81.0	91.3	122.0	148.0	98.8	26.6	8	64.0	71.8	86.9	114.8	131.7	91.8	23.9
wlntc200	11.0	44.4	54.0	82.2	106.7	138.0	82.6	29.5	8	53.3	56.1	77.9	103.8	116.7	80.5	24.3
wlntc3	11.0	55.0	85.7	122.9	136.7	150.0	111.4	31.7	8	55.0	73.2	102.3	128.2	138.3	100.7	30.5

Appendix 17(k). Stressor Identification (SI) monitoring (2001-2011) data summary for seston algae chlorophyll A.

Site	Sestonic Algae Chlorophyll A (ug/L)															
	All Samples				July - October											
N	Min.	Q25	Median	Q75	Max.	Mean	Std.Dev.	N	Min.	Q25	Median	Q75	Max.	Mean	Std.Dev.	
bmc1	36	<1.0	<1.0	<1.0	3.8	28.0	3.3	5.4	9	<1.0	<1.0	<1.0	3.0	18.0	3.3	5.7
bmc3	34	<1.0	<1.0	<1.0	1.0	8.0	1.7	1.8	9	<1.0	<1.0	<1.0	2.5	8.0	2.1	2.4
cmpc53	5	1.0	2.5	5.0	229.5	420.0	93.8	183.0	4	1.0	2.0	22.0	325.0	420.0	116.0	203.0
dc1	14	<1.0	<1.0	3.0	5.3	25.0	4.9	6.3	10	1.0	3.0	3.5	7.0	25.0	6.3	7.0
dc2	13	<1.0	1.0	2.0	5.0	9.0	3.2	2.5	9	1.0	2.0	5.0	5.0	9.0	4.2	2.4
drc1	31	<1.0	1.0	2.0	5.0	10.0	3.4	2.8	11	<1.0	1.0	2.0	6.0	9.0	3.1	2.7
drc4	31	<1.0	1.0	2.0	3.0	14.0	3.1	3.5	11	<1.0	<1.0	1.0	3.0	7.0	2.2	2.0
hckrc158	42	<1.0	3.8	6.5	18.3	170.0	20.2	37.7	14	<1.0	4.8	9.5	37.8	170.0	29.9	47.2
ldc1	43	<1.0	1.0	3.0	5.0	32.0	5.6	7.7	19	<1.0	3.0	4.0	8.0	30.0	7.6	8.4
ldc2	46	<1.0	1.0	2.0	4.0	31.0	4.3	5.9	22	<1.0	2.0	3.0	6.3	31.0	5.3	6.7
lfr14	3	5.0	5.0	7.0	30.0	30.0	14.0	13.9	3	5.0	5.0	7.0	30.0	30.0	14.0	13.9
lfr51	5	1.0	1.5	2.0	9.5	14.0	4.8	5.4	4	1.0	1.3	3.5	11.8	14.0	5.5	5.9
lyn1	45	<1.0	2.0	3.0	6.5	87.0	8.2	15.0	17	<1.0	3.0	6.0	13.5	48.0	10.5	12.8
lyn2	22	1.0	2.0	9.0	13.3	48.0	9.9	10.4	9	5.0	8.0	11.0	12.5	48.0	13.9	13.0
mfsbvc45	4	15.0	19.0	61.0	292.8	360.0	124.3	160.5	2	91.0	*	226.0	*	360.0	226.0	190.0
mlfrdc49	2	11.0	*	41.5	*	72.0	41.5	43.1	2	11.0	*	41.5	*	72.0	41.5	43.1
mrbc1	6	<1.0	2.5	13.0	27.5	44.0	16.0	16.3	6	<1.0	2.5	13.0	27.5	44.0	16.0	16.3
mrbc2	27	<1.0	1.0	3.0	5.0	8.0	3.3	2.4	13	<1.0	1.0	4.0	6.5	7.0	3.7	2.5
mrbc3	24	<1.0	1.0	2.0	4.8	94.0	7.2	19.1	9	<1.0	1.0	3.0	7.0	94.0	13.2	30.4
nfmqr28	5	10.0	12.0	16.0	38.5	52.0	23.4	16.9	5	10.0	12.0	16.0	38.5	52.0	23.4	16.9
nfmqr30	5	8.0	10.5	21.0	54.0	81.0	30.0	29.4	5	8.0	10.5	21.0	54.0	81.0	30.0	29.4
slvrc2a	25	4.0	8.0	14.0	24.5	100.0	21.4	22.5	12	4.0	8.0	14.0	36.5	100.0	27.5	30.7
wlntc1	11	<1.0	2.0	3.0	5.0	10.0	3.6	2.6	8	2.0	2.3	3.5	5.8	10.0	4.4	2.7
wlntc2	11	<1.0	1.0	3.0	4.0	10.0	3.4	2.7	8	1.0	2.3	3.5	5.5	10.0	4.1	2.8
wlntc200	11	<1.0	2.0	3.0	4.0	13.0	3.6	3.4	8	2.0	2.3	3.0	4.8	13.0	4.4	3.6
wlntc3	11	<1.0	1.0	1.0	3.0	11.0	2.7	3.0	8	1.0	1.0	3.0	3.8	11.0	3.4	3.3